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THE PRACTICAL TEACHER

DR. CECIL REDDIE.

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THE

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WITH OUR CHILDREN.

BY J. GUNN, M.A., D.SC.,

Author of "Class Teaching and Management," etc.

A May Meeting.

"MAY meetings!" exclaimed, in surprise, a clergyman of the fine old fox-hunting type, when an evangelical lady inquired if he always attended those important gatherings. "May meetings—meetings in May! There are *no* meetings in May! There *couldn't* be meetings in May!" To him, a meeting suggested "a southerly wind and a cloudy sky," with a covert of good repute close at hand; to her, the neighbourhood of Exeter Hall: pink coats in the one case, black coats in the other. But there *are* meetings in May, even of a kind where the colours may mix—black for the sterner sex; for the gentler sex, pink (or is it blue this year? Wedgwood blue, we believe, not indigo, and by no means to be associated with the traditional *bas bleu*). Such a meeting was held in the early days of the month in the thriving young port of Manchester—a meeting which ought to be of some importance in the estimation of those of us who would "live with our children."

The British Child-Study Association

selected Manchester for the place of its annual meeting this year, and the selection was fully justified. The Manchester Branch had made every provision for the success of the gathering, and the result was admirable. Nothing was lacking in the way of individual and collective hospitality to delegates, and the more public functions were carried through with brilliant success. After the experience of 1900, the branch which undertakes the arrangements for the gathering of 1901 will have before it an excellent precedent, impossible to ignore, difficult to follow, and still more difficult to surpass.

From Edinburgh to Manchester is by no means a "far cry" at the present day. Five hours in a comfortable train, with luncheon and tea *en route*, and there you are! But as one comes right into the centre of Lancashire, one begins to see what all this comfort and speed have cost the country. The dreary, dingy, deadly monotony which settles down on a rich mining and manufacturing district, the scarred and besmirched landscape, and the heavy, murky sky, are a heavy price to pay for wealth, luxury, and progress. One thinks of Ruskin on such a journey, and one cannot but think *with* him too. The only way to avoid it is to refuse to think, and when one finds thinking uncomfortable, there are always the illustrated magazines to fall back on. What a boon is reading when one wishes to flee thinking! But this is, literally, by the way.

An Exposition and a Criticism.

Thursday evening (3rd May) saw the first meeting of delegates, together with a large company of others like-minded, in the fine library hall of Owen's College, the Christie Library, by the kind invitation of the council of the College. The reception by the staff was cordial, and the gathering was in every respect successful. Such an opportunity given to those from metropolitan and provincial branches to meet socially and converse together, not always on strictly psychological themes, should do much to give solidarity to the movement and to ensure its permanence. The council of Owen's College have done more to benefit the cause of child-study by this exercise of hospitality than they could have done by many days and nights of labour in experimental psychology, did they possess every laboratory equipment yet invented for this branch of research.

Apart from its social aspects, the feature of the evening was a bright, racy little address from Professor Earl Barnes. There are men who can think and men who can speak. In this country these are often different men. We train men to think, expecting that the gift of speech will come by nature. Sometimes it does; usually it does not. In America, men

Next Month:

OUR JULY HOLIDAY NUMBER.

are trained to speak. No doubt they are also trained to think, but it is noteworthy that the American common school training gives a prominent place to the habit of expressing thought in words. The boys and girls are practised in the art of uttering in decently-ordered words what they or other people think. As a natural consequence, the educated American is usually a fluent and often a polished orator, ready in debate, quick in repartee, and fertile in illustration. One was reminded of this in listening to the informal and unpretentious, yet clear and appropriate, remarks of Professor Barnes. He gave some account of psychological study in America, with special reference to child-study. His characterisation of Professor Stanley Hall as a man whose gift was to suggest and to inspire others rather than to work out results, of Professor James and his inimitable treatise, and of American psychologists generally as having given up child-study—a remark which caused every one to stare—but as eager in the study of genetic psychology—which is the same thing under a new name—was entirely delightful and memorable.

There was one noteworthy point in the address. The professor informed his hearers that the new movement in psychology had already resulted in the establishment of some sixty fully-equipped chairs of experimental psychology in the United States. Here surely is matter for envy, and good reason for the psychologists on this side of the big water to blush or to be indignant according as they blame themselves or others for our neglect of this branch of study. Sixty full professors of a collateral branch of what we vaguely term "philosophy"! Small wonder that "genetic psychology" is regarded as rather more than a fad in the West.

And yet the speaker indicated that such splendid opportunities had not been so fertile in practical results as might have been expected. This he attributes to the laboratory work being practically confined to psycho-physics. Hence the study failed to attract practical professional and business men, to whom it should be of service as enabling them to "know the other man," who forms the second person in all transactions. This idea of experimental psychology as a help to the knowledge of character and motive, and as being useful in the equipment of all men who have to deal with other men, is a most attractive one. Of course it is quite analogous to the case of the teacher who studies "genetic psychology" as an aid to managing and instructing children; but to those who have been accustomed to regard insight into character as purely a matter of instinct and experience, it is somewhat novel and startling. One can imagine the future company promoter studying intently the phenomena of illusions, and the retail dealer experimenting with the "summation of stimuli," in order to find out the number of displayed advertisements required to induce the average man to buy a commodity which he does not want. There are endless possibilities in experimental psychology thus regarded. And yet, why should it not be so regarded? Why should not practice be based on exact theory wherever possible? Every successful politician, for example, has some unformulated theory regarding the quality and quantity of argument judicious to use with any given type of audience: he can forecast the reception which every point of his speech will meet with, or, in case of miscalculation, he can retrieve his defeat; he is a psychologist who has made the political platform his laboratory. But to formulate his knowledge so gained in order that it may be available for others is a different matter. Perhaps we shall have a course of experiments and lectures some day on the genesis of political opinions, with hints as to the use of logic in extreme cases. One would have enjoyed a fuller discussion of such developments of experimental psychology; but the professor's time was limited.

The speaker was listened to throughout with close attention and evident enjoyment. His exposition and his criticism together laid his audience under an obligation which they were not slow to express, and which was voiced becomingly by Principal Hopkinson, Professor Alexander, and Professor Withers. The Conference had certainly opened under happy auspices.

Business and Pleasure.

Friday morning opened with the annual meeting of the council, under the presidency of its vigorous chairman, Mr. Holman, H.M.I. A new and active branch at Liverpool, presided over by Professor Woodward, who was present as a delegate, was welcomed into the Association, and other necessary details of business were transacted. *The Paidologist*, the Association's publication, whose name is not its most attractive feature, was granted a renewed lease of life under the same auspices. This magazine, with a modesty rare in youth, "does not advertise;" but we beg to warn our readers that if they wish to secure complete sets by the purchase of back numbers, there is no time to be lost. Its value to those interested in "genetic psychology"—to use the full-dress appellation which our cousins have invented to drape the innocence of child-study—is sufficient to warrant the prediction that it will soon reach a larger circulation. Some readers may be grateful for the information that copies may be obtained from the Editor, Cambray House, Cheltenham.

Business over for the time, and thereafter lunch, a period of pleasure was in store for the Congress. Through the kindness of the council of the Girls' High School, who had likewise provided rooms for the business meetings of the day, an exhibition of the work done by the pupils of the school, and of the pupils themselves at work, had been arranged by Miss Burstall, the head-mistress, and her staff. It is unnecessary in a journal of this stamp to describe what was displayed to the members of the Congress. Specially interesting, from its originality and spontaneity, was the series of large drawings by pupils illustrating various stories and poems, in which both artistic power and humour, conscious and unconscious, were clearly evident. Of the oral lessons which visitors were invited to witness, the French class conducted on modern lines was specially interesting. But this is not an inspector's report on the school. It is enough to say that the treat provided for the visitors was thoroughly appreciated and enjoyed. Delegates would have enjoyed it still more but for the fact that the business meeting of the society was fixed for 3.30, which prevented their having the pleasure of listening to an address given by Miss Burstall.

The business transacted was mainly a ratification of what had been decided on by the council in the morning, with well-earned votes of thanks to the Manchester Branch and to the general secretary, Mrs. Langdon Down, whose labour of love means so much to the society. As a kind of afterthought, office-bearers were elected for the year—the only change in the list being that Professor Lloyd Morgan was elected president in succession to Dr. T. S. Clouston. There was little time for "experiences;" but a few useful hints were interchanged by the delegates as to methods of work in the various branches, and a small committee was appointed to formulate some typical schemes of work for general guidance.

Good psychologists recognise the connection of mind with body, and in this respect the council of the High School showed their orthodoxy by entertaining the Association to afternoon tea in the dining-hall at the close of the business meeting—an exercise of hospitality which seemed to be very highly appreciated, and which by its prospect may have aided in rendering that meeting so commendably brief, and free from all but the most pointed eloquence.

The Event of the Meeting.

Professor Sully's address on Friday evening, in the History Theatre of Owen's College, may justly be described as the event of the meeting, both on account of the position of the speaker in the scientific world, and the audience which assembled to hear him. He confessed to a considerable departure from the original plan of his address, due to certain important German criticisms of some of the methods of child-study. To some extent this was unfortunate. The weaknesses of the *questionnaire* method are sufficiently obvious, and they are perfectly well known to those who have taken part in such experiments—much better known to them, indeed, than to their critics. The only difference is that the intelligent experimenter also knows the residual value, after making all deductions, and of this the popular critic is, of course, ignorant.

BRITISH MUSEUM

Since the address was delivered, we have been assured, in a criticism by a prominent educational organ of Professor Earl Barnes's latest paper on this subject, that statistics based on such *questionnaires* are the only results so far of child-study. This statement is probably due to nothing worse than mere ignorance of the movement—an ignorance which will awaken regret rather than surprise. We are told that this was not the method of Preyer; and any experimenter who makes a habit of dictating questions to children under three years of age will be grateful for the information.

Professor Sully's remarks were, of course, on a different plane of thought, and worthy of careful consideration. He took care to point out that if, say, a certain percentage of children preferred wax dolls to wooden ones, the fact was not merely of value to the maker of dolls, but showed that the choice rested on some psychological element, such as a preference for the material which most closely resembled the reality represented by the doll. At the best, however, the knowledge gained by such inquiries was only fragmentary, and he showed the superior value of observations of individual normal children. Those who have read the professor's *Studies of Childhood*—and who has not?—and more especially his *Extracts from a Father's Diary*, will easily understand his preference for this method of study. We should all prefer it, and find little need for aught else, if all observers were of the mental calibre of Professor Sully. *O si sic omnes!* Meanwhile we must be grateful for even fragmentary observations, while still more so, of course, for the slower and more complete work done by competent observers of individual children.

Some of the lecturer's remarks were of special value to teachers, of whom there must have been a considerable number in the audience, to judge by the quick appreciation of such remarks. In discussing the differences and the similarities among children, he observed that parents were apt to exaggerate the points of difference (there being no children like our own children), while teachers were too apt to assume that all children are alike. Hearty approval was given to the remark that the training of every teacher should include original work in the observation of some point in the development of the mind of some individual child—a counsel of perfection as things stand at present. He also emphasised the point that in teaching a class the individual pupil is the real object before the teacher.

A most interesting lecture was brought to a close by pointing out certain aspects in the development of character regarding which individual observation was much needed, and should be kept before the society as an important aim.

A New Definition.

While discussion was not invited, some valuable comments were offered at the close by Professors Alexander and Earl Barnes. The former speaker, in paying a deserved compliment to Professor Sully's style as a writer and a lecturer, took occasion to contrast with it the lectures of less highly gifted psychologists, illustrating by reference to his own experience. He declared, with a frankness only equalled by his modesty, that one of his lady students had privately avowed to a friend that his lectures consisted of "things which every one knew perfectly well, expressed in language which no one could understand." The audience enjoyed the epigram, which is really a brilliant one. It ranks with the famous description of metaphysics as "a blind man groping in a dark room for an object which is not there." How many lectures and books, not on psychology alone, may be tersely described as consisting of "things which every one knows perfectly well, expressed in language which no one can understand." One receives a definition of this kind with the most profound gratitude, and the pleasure of using it will help to take the sting from the suffering caused by many obscure platitudes in the future.

All were eager to hear Professor Barnes express the objections which he no doubt felt to some of Professor Sully's positions; but he refused to be drawn, and cleverly turned the position by telling a story which, at the end, every one suddenly saw to be a parable, having for its moral that whatever were the difficulties in the way of child-study, they must be faced, and the work must be carried on as best it may.

A Collection of Gems.

Now our little May meeting was over. The Manchester Branch, however, had left no loose ends or abrupt conclusions about their programme; they had made arrangements for an artistic close. Accordingly, on Saturday morning, members of the Conference were invited to the John Rylands Library, where the librarian had courteously agreed to exhibit for their edification the unique collection of treasures over which he presides. This was a shrewd conception on the part of our Manchester friends. A stranger, especially a very superior person, visiting that great busy hive of industry, and seeing it only superficially, as even superior persons have been known to do, would be very ready to conclude that the city was wholly given over to money-making, and that in the view of its inhabitants anything which is not a textile fabric has no real existence. To correct such a misconception, no better plan could have been taken than to organise a personally-conducted tour among the gems of the John Rylands Library.

A full history and description of the place, and even a catalogue of its contents, may no doubt be easily obtained, and we have no intention of poaching on the ground of such publications. Yet the pleasure of even a hurried visit to so remarkable a collection, so worthily housed, cannot be passed over in absolute silence. The contents of the cases arranged down the main hall alone, with their priceless manuscript volumes so richly illuminated, their quaint woodcuts, and their early printed books, many of them absolutely unique, would make the reputation of any library. The wonderful early printing room is crammed with books, all in firstrate preservation, dating within twenty or thirty years of the invention of printing—the work of Caxton and of his contemporaries abroad. To look at, and still more to handle reverently, such treasures awakens a feeling which must be somewhat akin to that of a girl who is allowed for the first time to "nurse the baby" for a few minutes, and, very properly, it is a pleasure which is somewhat jealously guarded by the librarian: early copies of Caxton's works are not so plentiful as babies. Another room to dream in, or talk with bated breath, is that which enshrines the Aldine Press editions. But time prevented more than a most cursory and imperfect view of the contents of this great library—a legacy worthy of a great citizen and a great city.

It was a visit which impressed one with the idea that the Decalogue would have been better had it stopped with the ninth commandment, or had it added to the tenth an exception in the case of old books. If any citizen of Manchester can walk through this marvellous collection without covetousness, his moral level must be very lofty or his literary taste very modern. At any rate, the visitors were deeply impressed with the idea that there is more in Manchester than textile fabrics.

General Impressions.

How shall we sum up the results of this meeting? There is no "discovery" to report, and the child-mind has not been despoiled of its mysteries. The Association does not spend much time in congratulating itself on its achievements. "Still, it moves." Thoughtful and intelligent persons cannot engage in studies of this kind without much advantage—in the first place to themselves, and eventually to others as well. The mere recognition of the difficulties in the way of child-study, ably analysed as these were by Professor Suily, is no small gain. The encouragement arising from meeting others engaged in the work, and from such breezy, vigorous talks as those of Professor Earl Barnes, is stimulating to disappointed labourers. The interchange of opinions and experiences helps to foster community of interest and uniformity of method such as cannot but be helpful in future work of observation and experiment.

Even the already omniscient paragraphist may learn something from the gathering. A movement which has the active support of Professors Sully, Lloyd-Morgan, Earl Barnes, Alexander, Withers, and Woodward, Principal Hopkinson, Drs. Clouston and Langdon Down, and the lesser lights of philosophy and education which were assembled, can no longer be described as a fad, unless the meaning of that term

be enlarged considerably beyond its common range. Child-study, or genetic psychology, has come to stay. It is the legitimate modern, scientific, and theoretical development of Froebel's principle, "Come, let us live with our children." Such an attempt must be made along several parallel lines of advance, the importance of any one of which does not detract from the value of any other. Individual observation, collective experiment, and psycho-physical investigation have each their place, and are all needed. To represent the modern movement as antagonistic to the principles of earlier investigators of child-life is simple ignorance—it may be mischievous ignorance if it persists in quarters where knowledge is to be reasonably expected—and such a May meeting as that here described in fragmentary fashion should do something to enlighten the unprejudiced observer of educational movements. If only the polemics of education were less engrossing in this country, we should be able to see more of the legitimate problems of education which are pressing for investigation and solution.

THE ELEMENTS OF SCHOOL HYGIENE.

BY ARTHUR NEWSHOLME, M.D., F.R.C.P. (LOND.),

President of the Incorporated Society of Medical Officers of Health; Examiner in State and Preventive Medicine to the Universities of London and Oxford.

INFECTIOUS DISEASES IN RELATION TO SCHOOL LIFE.

THE closing of schools may be required to stay an epidemic, when the exclusion of particular children from school has not been successful. The rules governing the exclusion of individual children have been already stated. They do not always succeed, partly because of the limitations of our knowledge, and partly because conscientious action does not always follow such knowledge as is possessed. The difficulties as to *limitations of knowledge* are the most difficult to overcome. Even when a medical practitioner has seen the patient, a mistake is occasionally made. This will be made clear by two examples. The doctor sees a child with sore throat, really indicative of diphtheria, in which no "membrane" can be seen on examining the tonsils. The patient is poor, and the doctor is not asked to see the patient next day, when more obvious symptoms are visible. The child rapidly recovers—some cases of diphtheria are so mild that at the end of three or four days all naked-eye signs of disease have disappeared—and in another week may resume attendance at school. The dried nasal discharge on his pocket-handkerchief, his personal apparel, the dust of the saliva with which he may clean his slate, are all still extremely infectious—not to speak of the further possibilities connected with kissing, passing sweetmeats from mouth to mouth, and so on. Or a child has a red rash, with scarcely any sore throat. A dispensary letter is applied for, but the doctor does not arrive until next day. The rash has now faded, and the doctor, in view of the slightness of the symptoms, comes to the conclusion that the disease is not scarlet fever. He omits the precautionary measures to urge isolation until the time for desquamation of skin has elapsed. The child returns to school; at the end of two or three weeks attention is called to the particular school by other cases of scarlet fever among its scholars; and a personal examination by the medical officer of health reveals the fact that this particular child is "peeling."

The *difficulties due to lack of conscientiousness* on the part of parents are almost as difficult to overcome. Sometimes their conduct can be better described as ignorant but culpable carelessness. The child was "not bad at all," only a "slight cold" or "a little sore throat;" and slight cases of this kind are the chief cause of spread of disease in school. The teacher should miss no opportunity of emphasising the fact that the degree of infectiousness is not proportional to the severity of the case. It is the slightest cases that are most apt to spread disease. Occasionally the mother conceals facts as to illness in the house, particularly measles, sending children to school from a house reeking with infection. It would be easy to multiply examples; but the sum of the whole matter is that we cannot hope entirely to stop school epidemics until we secure the co-operation of mothers, and this will only be practicable to the full extent when a higher ethical standard of conduct than that holding good at present has become the rule. Could not clergymen and ministers help us in this matter? Teachers, again, might advantageously take an occasional opportunity to address their elder children on the subject, giving the gist of the rules and principles which have been laid down in this and my former articles.

The **closing of schools** is to some extent an admission of failure to prevent the spread of disease. The responsibility for this failure must be divided between the sanitary authorities, the school teachers, and the parents. What is the relative share of these three? It varies in different instances; but in adjudging of the responsibility of the sanitary authorities, let it be borne in mind that most infectious diseases are *spread by infection from child to child*, and that evil conditions of drains, etc., occupy a minor place in the matter. It is important that they should receive attention; but it is contact between healthy children and sick children or children from infected houses that is the chief cause of the spread of disease. It is clear, therefore, that parents must be held primarily responsible, and that teachers can reduce their responsibility to *nil* by furnishing the medical officer of health with the returns described in my last article.

Art. 88 of the Code of Regulations for Day Schools prescribes the conditions under which school closure can be enforced. It states:—

> "The managers must at once comply with any notice of the sanitary authority of the district in which the school is situated, or any two members thereof acting on the advice of the medical officer of health requiring them for a specified time, with a view to preventing the spread of disease, or any danger to health likely to arise from the condition of the school, either to close the school or to exclude any scholars from attendance; but after complying they may appeal to the Department if they consider the notice to be unreasonable."

This notice gives the sanitary authority power either to close the entire school, or to exclude particular scholars from attendance. The latter subject, and the methods of obtaining grant for children thus excluded, have been already discussed. The power to close the school is given to any two members of the sanitary authority acting on the advice of the medical officer of health. This is to ensure promptitude of action; which is further ensured by the fact that any appeal against the closing order to the Board of Education must be *after* the notice is complied with.

The conditions requiring closure of a school are clearly indicated above—(*a*) a serious amount of infectious disease in the school; (*b*) an insanitary condition of the school. The latter is the simpler case, and may be taken first. If the drains are choked, the closets in a foul and defective condition, and still more if the underground

drain on examination is found to be leaky, thus involving the danger of effluvia of a dangerous character escaping into the schoolrooms or the lavatories and closets used by the children, the school should be closed while the necessary work is being executed. Where the condition is such as to admit of delay, structural works should always be carried out during the long vacations.

The following rule is laid down in a Memorandum by the Local Government Board as to closing schools on account of an epidemic :—

"*As to the Closing of Schools.*—This, by more seriously interfering with the educational work of a district, is a much more grave step for a sanitary authority to take than to direct the exclusion of particular scholars. It is a measure that seldom ought to be enforced, except in presence of an actual epidemic, nor even then as a matter of routine, nor unless there be a clear prospect of preventing the propagation of disease, such as could not be looked for from less comprehensive action.

"The mere fact that in an epidemic many of the sufferers are school children does not necessarily show that the disease was caught at school; but the school may with probability be regarded as spreading infection if in a large majority of households attacked the first case be a child attending school, and with still greater probability if a number of children living at a distance from one another, and with no circumstances in common, except that they attend the same school, should be simultaneously attacked, and if it can be ascertained that a child or teacher in an infectious state has actually been attending the school."

The two following considerations are given in the same Memorandum :—

"In deciding whether an outbreak of infectious disease among children of school age may be best combated by closing the school, or whether it will suffice to exclude the children of infected households, the two most important points to be considered are :—

"(*a*) The completeness and promptness of the information received by the officers of the sanitary authority respecting the occurrence of infectious cases.

"(*b*) The opportunities which exist for intercourse between the children of different households elsewhere than at school."

We have assumed in our previous remarks that under (*a*) the Infectious Disease (Notification) Act is in force, and that the teacher gives all possible information to the medical officer of health.

Under (*b*) the question of preventing "school-treats" and preventing attendance for an equal period at Sunday schools requires consideration. There is no legal power in these instances. Usually those responsible for Sunday schools will close them when requested to do so, but this is not universally true. It is obvious that the full benefit of day-school closure cannot be secured if the same children continue to attend Sunday school. Sunday schools, furthermore, owing to denominational considerations, often represent a wider constituency than day schools, and may thus be the means of spreading infection over a wider area. Still, even if the closure of Sunday schools cannot be secured, it does not follow that day-school closure should not be enforced. For (*a*) the possibilities of personal communication on a large scale are approximately reduced to one-sixth; and (*b*) the chief cause of "failure of carefully-considered measures of exclusion to stay the spread of an epidemic which shows a special incidence upon school children" may thus be eliminated, as such a failure commonly points to the continued attendance at school of children with the prevalent disease in a mild or unrecognised form. Such children are less likely to be sent to a Sunday than to a day school.

School closure is usually much more effective in checking the spread of disease in sparsely-populated rural districts than in towns. In the former, the children of different households or of separate hamlets rarely meet except at or on their way to the village school. But although this is true, it still remains a sound rule that by closing a school in a town we remove the chief means of intimate intercourse between children on a large scale, and thus do good, even though we cannot entirely prevent other forms of intercourse. Occasionally it is also desirable to close a school for *measures of purification and disinfection*, when a number of cases of infectious disease have occurred in it. Too much importance is attached by the laity to disinfection. Unlimited faith is placed in sprinkling carbolic powder or sanitas, or even in exposing trays containing Condy's fluid in the room. All these are useless. They are even harmful, in diverting attention from the really important matters. If a dust-bin or a water-closet or urinal emits a foul odour, the proper remedy is not the application of disinfectants, but the thorough scrubbing and cleansing of the malodorous apparatus, and the substitution of an efficient for a defective apparatus. I have long made it a rule, when householders call for disinfectants, to take the opportunity of having the premises inspected, and the cause of the nuisance remedied, not simply smothered by deodorants. If books have been handled by infected patients, they should be burned. Disinfection of books is difficult, if not impracticable. Slates should be thoroughly washed. Desks should be scrubbed out, and every part of the walls and floors also washed. The best disinfectant is soap and water, effectually applied to every square inch of the schoolroom. The germs of disease, when submerged in soapy water, can do no harm. It is only as dust, scattered about the room by every movement, that they are potent for ill.

To sum up: school closure is indicated (1) if measures of exclusion of individual children have failed to prevent the continued and increasing spread of disease among school children in excess of the incidence of the same disease in the rest of the district, and particularly among the children attending other schools; (2) if, by reason of the absence or exclusion of a large number of children, the attendance at school is greatly reduced. This is particularly apt to happen in epidemics of measles, and then the managers not infrequently request that the school may be closed by order of the sanitary authority.

THE N.U.T. EXECUTIVE.

ELECTION OF CHAIRMEN AND VICE-CHAIRMEN.

THE Executive, at its first meeting, on 5th May, elected the chairmen and vice-chairmen of the various committees. They are as follows :—

Committee.	*Chairman.*	*Vice-Chairman.*
Education	Mr. R. Wild, B.A.	Mr. A. Croft.
Finance	Mr. F. Peaker.	Mr. J. E. Holden.
Ladies'	Miss Cleghorn, L.L.A.	Miss Goodwin.
Law	Dr. Beach.	Mr. W. Hurden.
Organisation	Mr. A. R. Pickles, B.A.	Mr. A. S. Caudle.
Parliamentary	Mr. R. Waddington.	Mr. T. F. Bowers, B.A.
Rural	Mr. R. R. C. Gregory.	Mr. F. C. Blackburn.
Superannuation	Mr. T. B. Ellery.	Mr. H. Coward.
Technical	Mr. G. Sharples.	Mr. E. L. Oliver.
Voluntary Schools	Mr. G. J. Rankilor.	Mr. T. Butland.

EDUCATIONAL HOLIDAY COURSES WITH OUR CONTINENTAL NEIGHBOURS, 1900.

Where held.	Date.	Fees.	Return Fares from London, 1st Class Steamer, 2nd Class Railway.	Lowest Cost of "Pension" per Day.	For further information address:	Principal Subjects, etc.	Important Details.
GERMANY:							
Bonn.....	August 6–18.....	20 marks.....	£2, 18s. 9d.	3 to 4 marks.	Fräulein J. Gottschalk, Hofgartenstr. 17.	German Language and Literature, History, Art, Geology, and Geography.	For women only. No special arrangements for foreigners. Chiefly for German teachers. Suitable for advanced foreign students.
Greifswald.	July 16–August 4	20 marks.....	£8, 1s.	3 to 4 marks.	Ferienkurse, Greifswald.	German and French Literature. Methods of modern language teaching. Phonetics, Pedagogy, Natural Science, History, Geography.	For teachers of both sexes. Special conversation classes for foreigners, conducted on most modern methods.
Jena.....	August 6–18 (conversation classes continue until August 25).	Entrance, 5 marks. Each course of 12 lectures, 15 marks. Conversation classes (18 lessons and 6 excursions), 30 marks.	(To Weimar) £4, 9s. 3d.	3 to 4 marks.	Frau Dr. Schnettger Gartenstr. 2.	Pedagogy, Natural Science, History of Art, Mental and Moral Science, Religion, German Language and Literature. Education of defective children.	For teachers of both sexes. Renowned for its course of Pedagogy. Conversation classes (elementary and advanced) for foreigners.
Marburg...	1st Course, July 8–28; 2nd Course, August 5–25.	30 marks for each course; or for both, 45 marks.	£3, 15s.	2 marks 50 pfennigs to 4 marks 50 pfennigs.	Herr A. C. Cocker, Villa Cranston; or W. G. Lipscomb, Esq., Hon. Sec., Modern Language Association, University College School, London, W.C.	Pedagogy, Psychology, Natural Science, History, Phonetics, German Language and Literature, French Literature, English Literature.	For teachers of both sexes. Conversation classes (elementary and advanced) for foreigners.
FRANCE:							
Elbeuf.....	August 3–28*....	£2, 2s., if name is entered before July 15; otherwise, £2, 5s.	£1, 16s.—that is, 33s. to Rouen and back, thence book to Elbeuf.	5 francs.....	H. B. Garrod, Esq., 74 Gower Street, London, W.C.	French Literature, History, Language. Political, social, and economic aspects of France.	Under management of special committee appointed by the Teachers' Guild. To promote a knowledge of the French language, customs, etc., among English people.
Lisieux....	August 3–28*....	As above.....	£1, 18s.	5 francs.....	As above.....	As above.....	As above.
Tours.....	August 3–24*....	As above.....	(To Paris) £2, 10s. 3d. (Paris to Tours) about 14s. 6d.	6 francs.....	As above.....	As above.....	As above.
Paris.....	1st Course, July 2–31; 2nd Course, August 1–31.	100 francs admits to both courses; 60 francs to all the lectures of a single course. Each lecture, 1 franc. Each conversation class, 50 centimes.	£2, 10s. 3d.	5 francs.....	Monsieur le Secrétaire, L'Alliance Française, Rue de Grenelle 45.	Classical and Modern French Language and Literature. Elocution and Pronunciation. Phonetics. Institutions and Arts of France.	Elementary and advanced courses. Special courses on history of French art and institutions. Conversation classes.
Paris.....	Christmas and Easter Holidays.	25 francs per week.	As above.....	As above	Monsieur Louis Jadot, Universite Hall, Boulevard Saint Michel 95; or W. G. Lipscomb, Esq., Hon. Sec., Modern Language Association, University College School, London, W.C.	Study of French in groups of three or four. Visits to places of interest in Paris; also lectures on Literature, Art, Educational and Social Life of Paris.	Preparatory to summer courses of L'Alliance Française, and to the examination for the certificat d'études françaises de l'université de Paris.
SWITZERLAND:							
Geneva....	July 18–August 28.	40 francs, and 6 francs for special conversation classes and correction of written work.	£5, 11s. 1d.	4 francs.....	Monsieur Bernard Bouvier, Bourg-de-Four 10, Geneva.	Classical and Modern French Literature, French institutions. Special classes for study of spoken language, rhetoric, style, syntax, and methods of teaching.	Specially intended for advanced foreign students of both sexes.
Lausanne..	July 19–August 29.	30 francs.....	£5, 1s. 4d.	4 francs (possibly 3 francs 50 centimes).	Monsieur J. Bonnard, Avenue Davel 4, Lausanne.	History, Literature, and Philology; Phonetics. Special study of spoken language. Psychology.	For foreigners of both sexes.
Neuchâtel.	1st Course, July 16–August 11. 2nd Course, Aug. 13–Sept. 8.	25 francs } ..... 25 francs }	£4, 19s. 6d.	4 to 5 francs.	Monsieur P. Dessoulavy, Académie de Neuchâtel.	General study of French Language and Literature.	For foreigners of both sexes. Elementary and advanced courses.

Note.—Programmes of most of these courses may be seen at the Education Department Library, Cannon Row, Whitehall, S.W.

* These dates are given subject to alteration; the exact dates will be found in the Teachers' Guild Handbook, to be published in May.

ABBOTSHOLME.*

AS all religions have been cradled in the East, so all reforms in education have come to be regarded as necessarily made in Germany. This monopoly no longer exists. England has the

DR. CECIL REDDIE.

credit of originating what is perhaps the most significant educational reform of modern times. A genuine educational reformer is a phenomenon rare enough to demand some attention, especially from those who are engaged in education; hence the following brief notice of the most notable experiment in education which the present generation has witnessed.

An educational reformer is commonly a man who has come through much tribulation, and has suffered in his youth many things of many teachers. Were this all that is needed to produce one, the wonder would be that England has produced so few of them. But most men have the saving gift of a strong power of forgetting the evils of school life, and often the good as well. Only at rare intervals do we come upon one who can remember both the evil and the good, and who has, moreover, the insight and perseverance required to work out a scheme for future generations whereby the former may be avoided and the latter increased. Dr. Cecil Reddie is such a man: his name and his work have during the past ten years become known to a gradually widening circle; and now, by the publication of his recent book, *Abbotsholme*, they promise to reach a still wider public.

ABBOTSHOLME, FROM THE SOUTH-WEST.

We have called *Abbotsholme* a book, and in external appearance it *is* a book. Internally it has about the same amount of unity as one finds in a scrap-book or a birthday-book. There is a unity of spirit and aim, but a strange diversity of matter. It contains material for constructing the ten years' history of Dr. Reddie's educational work, but that work has been too engrossing to give him time to write its history. It gives the same kind of view of his work that one gets of a building from examining the architect's plans, elevations, and sections. But in order to make the cases parallel, we should have the drawings done in all varieties of style, and each to a different scale, with the measurements given now in feet and again in metres. Still, the views are there; that is the main thing. And they represent a reality of sufficient interest and importance to make it worth our while to examine and interpret them.

To speak without figure, the six hundred and fifty odd pages of the volume contain information of every possible kind regarding Dr. Reddie's work, expressed mostly in English, partly in German, partly in French, and partly in photographs. The contents include introductory explanations by Dr. Reddie, school prospectuses and records, press notices of his school, reports, descriptions, and opinions by experts at home and abroad, press criticisms of these, and other similarly varied material.

First in position, and an easy first in interest to many readers, comes an autobiographical introduction by Dr. Reddie—not the kind of autobiography which the interviewer delights to conjure forth from his victim, but a somewhat reticent revelation of the genesis of an idea. Here at once we fall upon the circumstance which impressed Dr. Reddie with the importance of school life: he had the misfortune of being left an orphan at an early age,

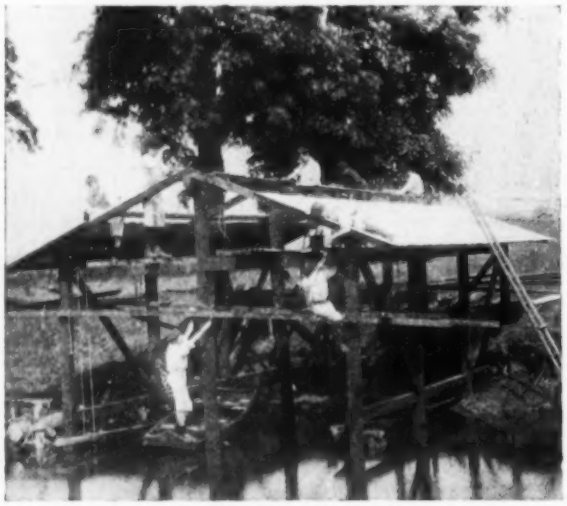
ABBOTSHOLME, FROM THE NORTH.

and the school world at once became his only world—not a mere satellite to a world of home ties. To this we can certainly trace much of the deep devotion to the school which marks the man in every stage of his life-work. His revelation of the ideas of a schoolboy is the work of a poet rather than a schoolmaster; and we make a mental note to the effect that a schoolmaster of the best type must have the insight and vision of a poet.

Passing from this, we note another circumstance which has had the best possible influence on his educational work—the fact that his studies were for some time directed towards the medical profession, and embraced much work in natural science. Those who know Abbotsholme can easily see in this an unconscious preparation for the work he has done there, and they will add that some medical skill and some acquaintance with natural science are also necessary in the ideal schoolmaster. As we read further, we go on to add still more essentials—interest in social problems, and familiarity with art and music. Our ideal schoolmaster will soon reach a stage difficult of realisation by large numbers; that is already clear. And yet as we see how each element in Dr. Reddie's rare equipment has borne fruit in his work, we cannot say that less than this is sufficient. He himself seems more conscious of defect than of superfluity. Regarding his early work as a teacher he says: "Unfortunately, circumstances forced us to commence our work without the needful preliminary studies; and we began our isolated attempts at what would now be termed 'child-study' almost completely ignorant of all the classical works on education, and not even aware to what a large extent other minds were working at the same problems. Had we been able to study, even for a few years, the experiments of others, our own future work would have been easier, and the outcome more valuable. But, on the

* *Abbotsholme, 1889–1899; or, Ten Years' Work in an Educational Laboratory.* By Cecil Reddie, B.Sc. (Edin.), Ph.D. (Göttingen), Head-master of the New School, Abbotsholme. [Contributions towards the organisation of a Normal Tertiary (Higher Secondary) School for English boys, of eleven to eighteen, belonging to the directing classes. No. 2.] London: George Allen.

other hand, such study and experience might have chilled, as is so often the case, the wish to innovate, or might have fettered the freedom with which our mind approached its task." There



BUILDING THE BOAT-HOUSE.

we have the *pro* and *con* of training for secondary teachers in a nutshell; and looking to the total number of useful innovations which we have received from the unfettered freedom of those thousands who have gone untrained to their work, we do not think them a sufficient recompense for the loss of value in the outcome referred to—nor, in fact, does Dr. Reddie himself.

This early lack of acquaintance with the principles and literature of his profession he has since made good in his own thoroughgoing way; and in other parts of the book we come across Dr. Reddie sitting at the feet of Professor Rein at Jena. There he realised what a curriculum implies, and the meaning of co-ordination of studies; not that he simply adopted the concentration scheme of the Herbartians ready-made, but rather that he grasped the principles on which this rests, and adapted it to the conditions and needs of the English schoolboy.

Here we may leave the personality of the man as completely equipped for his work. With an intimate knowledge of public school life, acquired in circumstances which gave that life a special value and importance; a rich and varied intellectual equipment; a mind trained to appreciate and to respond to human problems, and to the influence of art; a tendency towards the study of children, and the ability to pursue it as regards their body and mind alike; and, finally, an acquaintance with the best educational theories of the world—with these qualifica-

MAKING THE SKATING-POND.

tions in the man, we are prepared to find something good in his work.

To judge from the book before us, "Abbotsholme" is graven deeper on Dr. Reddie's heart than ever "Calais" was on that of Queen Mary, and happily by a precisely opposite process. Abbotsholme is his creation—the outward and visible expression of the man himself. It is only a school, and schools are plentiful enough; its significance is due to this fact, that it is a school designed in view of the nature of the human being and the needs of modern life, and not of traditions received from a time when life was utterly different, and the human being, at least in his juvenile phases, an almost unknown quantity. Taking the world as he finds it, Dr. Reddie does not agree with so many of his professional brethren that a dead language and the remains of an ancient literature form the only means, or even the best means, of educating boys who are to bear their part in this terribly modern society of ours, even as regards merely intellectual training. And this dissent from educational orthodoxy, we are glad to know, does not arise from a want of classical training and culture, as in some cases it is said to do. It is not the result of ignorance, but of a fuller knowledge than most schoolmasters can boast. Here is heresy enough in itself to give Abbotsholme a unique place among English public schools.

Again, Dr. Reddie has realised that boys have bodies as well as minds to be trained and nourished, and he does not apparently consider that school games and school fare as generally provided are quite sufficient for this end. In his scheme of general education he puts first the heading, "Physical and Manual," and this includes not only the stock games of the public school, but actual manual labour in garden, field, and workshop. This is noteworthy, seeing his pupils are not of the class we are hearing so much about in our "rural" schools; they are described in the title-page as boys "belonging to the directing classes." Dr. Reddie puts the case for such training very clearly, on the side of health and of manual dexterity. His remarks on its social aspect are worth quoting: "A more wholesome feeling will be aroused towards manual labour, also a sounder conception acquired of the

ERECTING THE FRAMES FOR THE FOWL-HOUSES.

conditions of labour, and the quantity of work involved in the execution of any given manual undertaking.....A more healthy social feeling will be developed. The boys will not only acquire certain capabilities of permanent value, but will learn to do for themselves and for each other much that they are usually allowed to expect from servants." The reality and earnestness of the manual work done is abundantly proved throughout the various sections of the book.

Artistic training comes second. This is also of a thoroughly practical nature. Next comes the literary and intellectual. The keynote is, "The English tongue should form the foundation of the mental education of English youths;" which, however like a truism it may read, marks something like a revolution in English schools of the class in question. Next come modern languages, French and German, "which can be made fully equal to Latin and Greek as a mental discipline," and embody literatures which "have a much more direct bearing on modern life than those of Greece and Rome." Latin and Greek are not neglected, but naturally come later. History (ancient and modern) and geography are taught in connection with each other. So with the chief natural sciences, leading the pupil "successively through deepening analyses of life and the world." Music has a very prominent place—so much so as to recall the ideal scheme of Plato.

As regards morals and religion, it is recognised that morality is not "merely one among various branches of study," and yet it cannot be taught "merely by example, without the aid of ideas." This whole section is well worth quoting in full, did space permit.

Not the least admirable part of the scheme is the social training provided in the evening gatherings in the drawing-

room, instead of the more formal "preparation" in detached "studies." It need hardly be added that marks and prizes find no place in Abbotsholme. The whole ideal and tendency of

HARVEST HOME—THE LAST LOAD.

the school is incompatible with any artificial and anti-social stimulus.

Nothing can give in small compass a clearer idea of what is aimed at in Abbotsholme School than a copy of the daily time-table, which runs somewhat as follows:—

6.10. Rise (6.55 in Winter).
6.30. Early Meal; Drill.
6.45. First School.
7.30. Chapel.
7.40. Breakfast.
8. Dormitory Parade (making beds, etc.).
8.30. Second School.
10.15. Lunch.
10.30. Third School.
12.15. Bathing.
1. Dinner, followed by Piano or Organ Recital.
2-6. Drawing. Workshop. Garden and odd jobs. Games. Laboratory.
6. Tea.
6.30. Evening School.
7.15. Singing, Recitation, etc.
8.30. Supper.
8.40. Chapel.
8.50. Bed.

Here is a daily programme which may safely be left to speak for itself. It is sufficiently eloquent. Those who desire to know more of it, and to see it in actual operation as far as words can present a living reality, should not fail to read that section of the book which consists of an English translation of Dr. Hermann Lietz's delightful little book *Emlohstobba* (which is simply "Abbotsholme" reversed). Here one can pass a specimen day with Dr. Reddie and his boys in the most realistic fashion; the sketch is more eloquent than many volumes of theory.

THEATRICALS.

We would further direct our readers' attention to M. Demolins' articles on the school, and his appreciation of it as a mark of the "superiority of the Anglo-Saxon." And those who wish to know more of Dr. Reddie's views on education generally, apart from his own sphere of work, will be amply repaid by studying the reprint of his answers to the questions of the Secondary Education Commission, which forms chapter viii. of this wonderful "scrap-book." We transcribe a few sentences bearing on the subject of the training of secondary school teachers:—

"*How far is the same system applicable for the teachers of Secondary and for those of Elementary Schools?*

"All children are a great deal more alike when young than when older. Moreover, there can be only one way of getting a sound scientific grasp of any art.

"Therefore, evidently, *teachers of 'Secondary' or any other schools, clergymen, and university teachers* should all pass through the same training as Elementary teachers receive.

"All education must begin in the same way, in the Kindergarten and the Fore-School, and no teacher, however able, can teach any one, however clever, unless the former knows *the way in which the latter's circle of ideas has developed and is developing.*

"There is another reason. It is highly desirable that all teachers—in all grades of the profession—should be highly honoured and closely *bound together in the bonds of brotherhood.* The present water-tight compartment system is a source of national weakness. There is too much worldliness in place of devotion to quiet duty. There should be promotion possible all the way up and all the way down. It would not be a bad thing if some of the cultured, but quite untrained and unskilful, 'University' men would teach in the elementary schools, where there would be a splendid moral harvest—if no intellectual one—to reward careful husbandry.

TOBOGGANING.

"On the contrary, it would be no bad move to have the junior forms of 'Secondary' schools taught by trained Elementary teachers. Elementary teachers are thorough, but too mechanical and wooden. 'Secondary' teachers, as a rule, don't teach. The majority harangue the boys and write or talk elegantly. They often show an appetite for absorbing knowledge themselves, but they don't instruct. They can't, because they have probably never seen good teaching, and have learned only to *get*, and not to *give*.....

"*Should the Universities take any, and what, part in the work?*

"If the 'Universities' wish to avoid being left behind, they will take up this most pressing work.....

"The Universities should institute Education Departments and organise Training Colleges at every school where opportunities for such work could be provided. Training apart from a school life is like lecturing on medicine without a hospital.....

"What is chiefly needed is to provide as good education for the higher kind of worker as is in some slight degree already provided for the lower. Then, and not till then, will a reformed nation have adequate leaders to guide it amid the ever-increasing complications and difficulties of advancing civilisation."

To the penultimate chapter we must refer those who wish to see how far Dr. Reddie's pioneer effort has already led to emulation in this and other lands—especially perhaps in other lands, where foreign origin is not enough to condemn a good idea.

We should much enjoy picking out for the readers of this journal a few of the many educational aphorisms and other titbits in which the book is so rich, but we must refrain. If we have awakened interest in those who were previously uninformed regarding Dr. Reddie's work, and introduced his book to those who already know something of Abbotsholme, our purpose is fulfilled. The book itself must do the rest.

PATRIOTIC POETRY.

AT the present moment, when all classes of the empire are giving up ungrudgingly their bravest and most physically fit to fight Britain's battles with the Boers, patriotic poetry forces itself with special insistence on the public mind; and consequently, the children in our schools, in a way quite new to their young lives, have come under its influence. It is therefore almost a necessity for us, as teachers, to say something about it to our elder scholars; for they, like the crowd, are very apt, in their innocence, to mistake bombast for love of country, and jingling rhyme for poetry. Happy those teachers who can take history as a class subject, for that is the true instrument by which to measure these sentiments, and to see the present by light from the past. The pity is that something less important cannot be expunged from our syllabus to give it place; but as it is, we must do what we can, and there are at present probably few time-tables that are not being modified so as to give young Britons some knowledge of the origin and development of their country, and of their fathers' fights for its flag.

The reading lesson is that which most easily lends itself to history-teaching, and the repetition and the singing can be of the topics taken, whilst, of course, quite naturally now, all geography-roads lead to South Africa. This arrangement lends itself to the spirit of the hour, and enables the children to go on educating themselves after they leave school, in their homes, and in the streets, and by the newspapers; for is there any other topic just now besides "the war"?

After our young people have had lessons on Magna Charta, the first House of Commons, the Armada, the Revolution, and such-like matters, to show them how hardly our liberties have been obtained, we may draw attention to such other facts in history as Bannockburn, when defeat was better than victory, for it led later on to a peaceful amalgamation that otherwise would have been impossible. We can then bring them on to later times, when this nation, which our fathers fought so hard to make really free, was in gravest peril from Napoleon, who threatened its very existence. And being a heritage worth fighting for, men fought as for dear life to save it, and to pass it on intact to us.

Politics, of course, are undesirable in the schoolroom, and it is somewhat unfair for a teacher to try to colour the opinions of his pupils. Facts, if fairly stated, speak for themselves, and the young may be advised to be content with learning them now, and later on, when they have had longer time for thinking, to form their own opinions, and become partisans of the side which appears to them the right side.

But we wish just now to choose some patriotic poetry for their repetition, and before so doing we need to take an inward look of inquiry to know if we ourselves have the true meaning of the word "patriotism." "Love of country," everybody says, in instant reply. But that scarcely fits the idea to all minds, for one may love drink and many other vices till they become fatal to the lover; simply to love one's country, right or wrong, may finally be fatal to it. Is not *true* patriotism rather a strong desire for our country's *welfare?* Is it not the teacher's *rôle* to show in what that welfare consists, and to point out that a nation's life, like an individual's, is only permanently prosperous and safe on the same foundations as are the bases of individual success and honour; that a great nation's watchword, like a great man's, should be *Noblesse oblige?*

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"Farewell, thou fair day, thou green earth, and ye skies,
Now gay with the broad setting sun!
Farewell, loves and friendships, ye dear, tender ties,
Our race of existence is run!

"In the field of proud honour—our swords in our hands,
Our king and our country to save—
While victory shines on life's last ebbing sands,
Oh, who would not die with the brave!"

After this we have some songs which caught immediately the rank and file of the nation, and sent numbers of recruits to the army—as Dibdin's songs sent recruits to the navy—with a better ideal of a soldier's life than had hitherto been theirs. "The Poor and Honest Sodger" was very effectual in this way. It was the impulsive outcome of a kind act of Burns, who with two friends was sitting at the window of a wayside inn, when, as often happened in those war-troubled days, an old soldier passed by. The poet rushed out to invite the man in to partake their fare, and to tell them the story of his life. In it we hear of the long absence from home, the return from "the tented field," and the romantic meeting again with the faithful girl, who would help a distressed soldier for the sake of the one she scarcely hoped to see again, followed by the happy confession that her eyes do behold the long-lost soldier laddie. The song then ends thus:—

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But glory is the sodger's prize,
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The brave poor sodger ne'er despise,
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Remember he's his country's stay
In day and hour o' danger."

Between them, Burns and Dibdin did more to prevent the establishing of conscription than any hundred men of their time; with which tribute we leave them both, to look at some beautiful allied poetry, which, though equally the outcome of the same war-time, shows us the other—the chastened and sublime—side of the battle-picture.

This we find in Mrs. Hemans's poems, which show us plainly how the continuous war made itself felt in the domestic life of our nation, and how a woman's eyes looked at the glory of it all. Her "Chieftain's Son" reminds us of a very recent and similar sad incident. The bereaved but victorious father says,—

"Speak not of victory! in the name
There is too much of woe:
Hushed be the empty voice of Fame—
Call me back *his* whose graceful head is low.

"Speak not of victory! from my halls
The sunny hour is gone;
The ancient banner on my walls
Must sink ere long—I had but him—but one!.....

"Speak to me once again, my boy!
Wilt thou not hear my call?
Thou wert so full of life and joy,
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"The Soldier's Deathbed" is equally pathetic. Here are a few of its lines:—

"*Like thee to die, thou sun!* My boyhood's dream
Was this; and now my spirit, with thy beam,
Ebbs from a field of victory!—yet the hour
Bears back upon me, with a torrent's power,
Nature's deep longings:—Oh for some kind eye,
Wherein to meet love's fervent farewell gaze;
Some breast to pillow life's last agony,
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Beyond the pass of shadows!—But I go.....
Your soldier, 'midst the mountains lying,
On the red banner of his battles dying."

And for another and brighter interest we can turn to the juvenile poem, written when the younger brother of the poetess returned from the fatal retreat under Sir John Moore, when his family had experienced great anxiety as to his fate.

This little poem reminds one of the imperishable ode on "The Burial of Sir John Moore," written with sublime pathos, though very near to the facts recorded in the newspapers of the day, by the Rev. Charles Wolfe, a young curate of Dublin. Who does not know the lines beginning, "Not a drum was heard, not a funeral note"? How boys love to be told of this quiet funeral of a hero, and the reason for the quietness, and of all that Britain at that time felt for her brave sons! For their elders there is an added interest in this poem—it illustrates so well what George Eliot meant by saying that "things hang together so." Here we have the burial of the hero under whom, at Corunna, Mrs. Hemans's soldier-brother served, whose return brought forth the poetic welcome mentioned above, whilst the hero himself was the son of that learned Dr. Moore who had been the friend and correspondent of Burns. It is most pleasing to know that the young clergyman who thus raised for himself a lasting monument was a hero also; for though he did not die on a battlefield, he sacrificed his life whilst young to the duties of a too large parish in Ireland.

In drawing from these, have we not for the children a fine blend of English, Scotch, and Irish poetry? J. M. D.

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PATRIOTIC POETRY.

AT the present moment, when all classes of the empire are giving up ungrudgingly their bravest and most physically fit to fight Britain's battles with the Boers, patriotic poetry forces itself with special insistence on the public mind; and consequently, the children in our schools, in a way quite new to their young lives, have come under its influence. It is therefore almost a necessity for us, as teachers, to say something about it to our elder scholars; for they, like the crowd, are very apt, in their innocence, to mistake bombast for love of country, and jingling rhyme for poetry. Happy those teachers who can take history as a class subject, for that is the true instrument by which to measure these sentiments, and to see the present by light from the past. The pity is that something less important cannot be expunged from our syllabus to give it place; but as it is, we must do what we can, and there are at present probably few time-tables that are not being modified so as to give young Britons some knowledge of the origin and development of their country, and of their fathers' fights for its flag.

The reading lesson is that which most easily lends itself to history-teaching, and the repetition and the singing can be of the topics taken, whilst, of course, quite naturally now, all geography-roads lead to South Africa. This arrangement lends itself to the spirit of the hour, and enables the children to go on educating themselves after they leave school, in their homes, and in the streets, and by the newspapers; for is there any other topic just now besides "the war"?

After our young people have had lessons on Magna Charta, the first House of Commons, the Armada, the Revolution, and such-like matters, to show them how hardly our liberties have been obtained, we may draw attention to such other facts in history as Bannockburn, when defeat was better than victory, for it led later on to a peaceful amalgamation that otherwise would have been impossible. We can then bring them on to later times, when this nation, which our fathers fought so hard to make really free, was in gravest peril from Napoleon, who threatened its very existence. And being a heritage worth fighting for, men fought as for dear life to save it, and to pass it on intact to us.

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THE FIRST PRESIDENT OF THE N.U.T.—MR. J. J. GRAVES.

ONE of the most graceful acts of York Conference of the N.U.T. was the resolution—passed with acclamation—to present the father of the Union, Mr. J. J. Graves of Lamport, with an honorarium of £100, as a memento of his continuous connection with the executive of the Teachers' Union from its inception in 1870 down to Easter 1900, when Mr. Graves, full of years and full of honours, felt impelled to deny his constituents the honour of re-electing him, as they have consistently done for the past thirty years, the chances and changes of educational politics notwithstanding. It was in 1870 that the *patres conscripti* of the teaching profession met at King's College and launched the good ship Union, with J. J. Graves at the helm; but we must go back as far as 1847 if we would find the beginning of Mr. Graves's work as a unionist, for in this year he was a member of a Teachers' Association at Cambridge, which met weekly for study and improvement under the presidency of the Rev. Harvey Goodwin, who afterwards became Bishop of Carlisle. In 1853 Mr. Graves was one of the leading lights of a meeting that met in London in the hope of founding a Teachers'

MR. J. J. GRAVES.

National Union which should be open to teachers of all denominations, and it was not his fault that an Associated Body of Church Teachers was formed instead. Mr. Graves did not sulk in his tent, but worked hard as secretary of this Associated Body from 1859 till 1863. But his hopes always prompted him to hope for a national as opposed to a sectional union, and accordingly, in 1868, we find him sketching an outline of a national union in the pages of *The Museum*, the outcome of which was the notable meeting at King's College in 1870 which gave birth to the N.U.T. How proud must Mr. Graves now be of the 40,000 unionists who have sprung from the 400 that rallied to the cry of union in 1870! Well may the Union honour Mr. Graves, for in no other way could it do greater honour to itself.

As a schoolmaster the first president has not been much of a rolling stone. Since 1851 he has been at the head of the Endowed School at Lamport, so that he will shortly complete his jubilee as head-master of the Lamport School. That he may live to enjoy this and many other honours will be the earnest wish of every member of the teaching profession.

SCHOOLS AND SCHOLARS IN 1900.

UNDER this title, Dr. Macnamara has issued his annual statement of "facts and figures for the reformer;" and if anybody doubts whether there is still need for educational reform, we advise him to spend an hour or so in studying this Supplement to *The Schoolmaster*. He will rise from this study a wiser and, alas, a sadder man. We can do no more than give a mere list of the headings under which Dr. Macnamara has grouped his pregnant array of facts; but we recommend all who desire that English education shall be worthy of England to get the Supplement itself, and to read, mark, learn, and inwardly digest it.

In his **Introduction** Dr. Macnamara draws attention to the fact that "intellectualism is becoming the ruling force in the world." We wish him hearty success in his efforts "*to create in John Bull a belief in intellectualism as a factor in national defence.*"

In dealing with **Attendance at School,** the writer has a topic concerning the importance of which all, from Sir John Gorst down to the humblest teacher, are agreed. That in the eighth year of free education we have only arrived at a percentage of attendance of 81·8 is truly "most deplorable," and we hope that Rochdale and the ancient city of Lincoln, as well as gallant little Wales, will be shamed from their position of a "worst bad" by the doctor's scathing satire. We hope, on the other hand, that the approval given to Sir John Gorst's "very useful little Bill" will help to convert the Bill into an Act, to the end that compulsion may cease from being such a farce as it is at present. Then, again, the **Early Age at which Children Leave** affords full play for the trenchant pen of the editor of *The Schoolmaster*, who, in common with all that love their country and their country's children, deplores the falling off of children as they pass the mature age of ten years. The temptation of the artisan to get an extra half-crown or so per week does not excuse, although it does account for, the betrayal of the town and country child. We note with approval the condemnation of Mr. Robson's Act as having further assisted in the "betrayal of the village child."

The "school children who toil out of school hours" deserve all the sympathy that Dr. Macnamara's large, warm heart accords them; and those who are guilty of this child-enslavement must indeed blush when this indictment of their callousness comes under their notice. The Society for the Prevention of Cruelty to Children would be well set to work in trying to obtain the dismissals of the sixty-nine boys and sixty-two girls under seven years of age who are employed in free England out of school hours.

Then as to **How the Schools are Financed** the doctor has much to say against which we opine but little of any solid weight could be advanced. The ideal support would be an imperial grant sufficient to meet all the legitimate wants of the school; this alone will remove the anomalies that are so clearly brought out in the doctor's digest, which conclusively establishes the oft-repeated statement that it is the voluntary teacher who bears the burden of the intolerable strain. Chapter and verse in support of this will be found in Section V. of the Supplement. Section VI. deals with **Schools by Denominations,** whilst Sections VII.–XII. are occupied with a discussion of the **Army of Teachers,** as to their quantity, quality, and remuneration, concerning which, as every teacher knows, volumes could be written; but the pith of all these volumes the author manages to give within the compass of three or four pages: for the Supplement is a veritable *multum in parvo* for the educational reformer, whose thanks will go out to Dr. Macnamara for the yeoman service he has done in so distinctly and succinctly placing these facts and figures before him.

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TALKS WITH TEACHERS ON PSYCHOLOGY.

I.—THE PSYCHOLOGY OF FALSEHOOD IN CHILDREN.

BY JOHN GUNN, M.A., D.SC.

PART I.

"WHAT is Truth?" is a question older than Pontius Pilate, and many attempts have been made to answer it. "What is Falsehood?" may be regarded as the converse question, and the answer to the latter will involve that to the former. The pioneers of philosophy tried, in a pictorial and metaphorical way, to find a philosophical basis for the explanation of the false as well as of the true. In the early stages of thought it formed a great puzzle, and many paradoxes were based on the seeming contradiction. What is false is unreal, and what is unreal does not exist; so it seemed to some that falsehood was non-existent, and therefore impossible and absurd.

If a Cretan writer declares that all Cretans are always liars, then, since he is a Cretan who says so, the statement must be a lie in order to be true; if, however, the statement be true, then he, a Cretan, is for one at least not a liar, and so he proves that the statement is false because it is true. Again the puzzle is propounded: "If you say you lie, and say so truly, is your statement true or false?" Such are some of the paradoxes in which they expressed the self-destructive nature of falsehood.

But whatever philosophers may have said or thought, it is clear that falsehood must have been well enough known in those early days, or they would not have taken so much trouble to find an explanation for it. The Hebrew writer who, according to the common translation, roundly asserts that all men are liars, makes a statement which is pretty much in accord with general experience, and we feel that he scarcely needs to apologise for having said so in haste. The modern world differs, no doubt, from the world of his time in many ways, but it would be difficult to acquit modern Christendom of the charge he brings against ancient Jewry.

To say that falsehood is common, if not, indeed, universal, may seem equal to charging ourselves with a low moral tone; but it is not by any means certain that all falsehood is to be regarded as immoral. Wherever a state of conflict exists, some form of deception, whether verbal falsehood or not, is one of the most natural and common means of warfare, especially by the weaker party. Nature is full of deception—in the imitative and protective colours of animals, for example, and in the habit which some of them have of "shamming dead" when in danger. And in human warfare, deception seems as fair a means of self-preservation as flight. True, there are limits beyond which such deception is regarded as unfair or unworthy, but who shall determine what these limits are? There is certainly no *a priori* intuition to guide us; and as to the common standard of opinion, that is a measure which changes from age to age.

Even in our own advanced stage of civilisation, no man or woman is presumed to be trustworthy where personal advantage or the advantage of friends is concerned. What is the meaning of our elaborate system of criminal justice but an avowal that no accused person can be believed? A wife's evidence in favour of her husband counts for nothing, and even a neutral witness must give his oath in support of his word. Whole classes of men whom no one would call immoral are yet held to be *ex officio* skilled in deception—not in saying what is false, but in ignoring one side of the truth. The advocate in his pleadings, the politician in his canvassing, and the editor of a party newspaper, are granted free liberty of suppressing truths that tell against them. And the common principle of *Caveat emptor* declares that the unskilled buyer must find out for himself faults in his purchases which the skilled merchant leaves unnoticed in recommending his goods. Here, again, there are limits beyond which suppression of the truth is regarded as immoral, but such limits are undefined and arbitrary.

Society requires also that we should practise falsehood rather than hurt the feelings of others by brutal truthfulness. We must address an acquaintance as "Dear Mr. ——" or "Dear Sir," and sign ourselves as "Yours truly," or "faithfully," or "sincerely," or "Your obedient servant," when we neither mean nor expect it to be believed that such relations exist between us. We "have great pleasure in accepting" invitations which we had much rather decline; we dare not decline them without alleging some other reason than a mere wish to decline; and when we do find some valid excuse, we give a sigh of relief, and hasten to declare that "we are very sorry it will be impossible for us to have the pleasure," etc., etc.

Language has been well described as fossilised metaphor; and we may add to this that there are certain strata in it, such as the language of conventional politeness, which consist of fossilised hyperbole. But though now fossilised and harmless, they were once living falsehoods.

There is no need to multiply instances. If absolute truthfulness be indeed one of the cardinal virtues, it is one quite incompatible with social life as at present developed. It might find a place in Herbert Spencer's absolute ethics—the rules of conduct applicable to a perfectly moral society; but for our own stage of progress we shall probably find a more practicable guide in Aristotle's rule—a mean between two extremes.

It is easy to see how falsehood has come to play so important a part in society. As a protection to the weak, it has fulfilled a definite function in the evolution of society. Under the forms of polite exaggeration or concealment, it does much to sweeten social intercourse still. Thus much we may recognise without entering on the moral aspect at all. And even if we wished to discuss its ethics, we should probably be forced to admit that, like every other exercise of human activity and intelligence, it is sometimes wrong and sometimes right.

Our present inquiry is not moral, but psychological. We have to try to investigate the mental processes which lead to the first practice of falsehood by the individual. And this is an inquiry in which we have great need of caution in order to avoid the moral bias. We are so accustomed to hear every juvenile falsehood characterised as an example of infant depravity and a proof of original sin, that it may be difficult to regard it calmly as an inevitable phase of intellectual activity. The child who is afraid to confess a fault and the child who is afraid to enter a dark room may stand on exactly the same moral plane, and may require exactly the same treatment in order to train them to our own moral standards—in the one case of truth, and in the other of courage. It is possible that this training should embrace a nourishing diet and open-air exercise, rather than the story of Ananias or the reforming use of the rod. There is a period—perhaps a longer period than we sometimes recognise—during which a child is beyond our moral judgments. His conduct is neither right nor wrong, any more than is the conduct of the lower animals. He inherits certain instincts and certain tendencies of action, both of physical and of mental action, which show themselves at various stages of his growth. But all his actions are then alike without moral quality. They may form what Professor Sully calls the raw material of morality, but that is all.

One child is strong and vigorous, with nerves not oversensitive, and imagination of the future not strongly developed. He faces all kinds of risks, and bears pain like a Stoic. Another is delicate, if not feeble, with sensitive nerves, and acute foresight of possible pain. But the boldness of the one is not courage, nor is the shrinking of the other cowardice. With such constitutions there may be a high probability of the one child becoming brave and the other cowardly, but these terms are totally devoid of moral significance until the children have developed into moral agents, capable of action towards remote or abstract ends adopted by conscious choice. To many students of child-psychology, indeed, the period of deepest interest has passed before the moral sphere has been entered.

Truth and falsehood may be regarded as correlative terms

—as a positive or negative aspect of the same thing. Truth we usually regard as the agreement of our thoughts with real things. Our discovery of truth is a series of experiments with mentally-constructed adjectives and verbs, which we apply to the real nouns around us in order to see whether they fit. If there is no reason to suppose that they *do not* fit, we are irresistibly carried to the conclusion that they *do*. Otherwise we should fall into a universal suspense of judgment and absolute scepticism. If we deny that they fit, our denial must be based on some positive knowledge which shows that the adjective thought of is incompatible with one previously affirmed.

Did *A* die of fever? If I answer "No," my denial must have a positive basis though I do not express it. My reason for denial may be that I see *A* alive before me. The mental adjective *dead* will not fit the living *A*. It may be that I know he died of some other disease, which is incompatible with the suggested adjective, dying of fever. Or I may have to answer "Yes." I may have sufficient warrant to *affirm* the suggested quality. I may have seen him die with the symptoms which accompany that disease, or I may have a letter, intimating his death from fever, in handwriting which I know to be that of the physician who attended him. The suggested adjective fits the reality.

It is, however, with matters of memory that questions of truth or falsehood generally arise. As I lay my head on the pillow, the question arises, "Did I lock the front door to-night?" Starting from the present, I run over my immediate past, as represented in memory, in order to see whether the ideal adjective *locking the door* will fit into my real past. Perhaps I have a clear memory of turning out the light in my study and walking directly upstairs to bed. This is incompatible with the suggested adjective, walking downstairs to lock the door, and on the basis of this positive memory I answer "No," and then reluctantly rise to perform that nightly duty. Perhaps my mind was so engrossed with the subject of this paper that I have no clear memory of what bodily movements I went through immediately before retiring. I am in doubt as to the true answer, "Yes" or "No." If the night is very cold and the house very dark, these things may bias me towards the answer "Yes," and I may mentally affirm what is really a falsehood. If I am very conscientious and not very sleepy, I descend to make the actual experiment as to whether the suggested qualification of locking applies to the real door or not; and by finding the door unlocked, I am able to answer "No," though memory would not have warranted this answer any more than the other.

Again, I may reason, if I had locked the door I should have remembered the action; and therefore I answer "No." But on descending, I find, after all, that the door is locked. Possibly the experiment now recalls the vanished memory, so that I can now remember having locked it, and I wonder how I came to forget. Perhaps, however, I still fail to remember the action, and the question now arises, Was it *I* who locked the door, or was it some one else? I cannot deny the action of myself, for I have no positive memory of the matter, and denial must have a positive basis. But I may know enough of the habits of the other members of my household to warrant my denying the action of each of them in turn, and thus I may be forced to affirm that I did it myself and forgot all about it.

Once more, it may be that when the question of locking the door occurs I recall my past, and find there a clue of memory that inclines me to think that I did perform that operation. But next morning I am reproachfully informed that I forgot to lock that door again last night. I search my memory once more, to see how the mistake came about. And now I find that when I first decided to retire for the night, the *idea* of going downstairs to the front door was distinctly before my mind. Then something else claimed my attention, and I went to my room without doing so. It was the memory of this *decision*, this mere idea, which recurred to me under the guise of the memory of *performing the act*. I find this a common error of memory: the intention of doing a thing is so clear, and leaves so vivid a memory behind, that if anything intervenes to prevent the act, it seems on reflection that the act has already been performed. When I was a somewhat lazy boy, I frequently fell asleep in the morning after so vivid an idea of having to get up that when I was effectually awakened it surprised me to find that I was not really up and dressed.

Now in such homely and even trifling incidents we may find by analysis many of the causes of unintentional falsehood in reporting of the past. And it will not be difficult, I think, to show that in very early life falsehood is always unintentional.

The great cause of falsehood in the early thinker is the confusion between mere imagination and memory. An image or idea is present to the mind: is it a mere image, as we call it, or is it a memory-image of our own past? What is the psychological difference between the two?

A memory-image brings with it the feeling of its *having been there before*. So far good, but this is not always enough; a favourite or recurring image of fancy has the same mark—it also has been frequently in the mind. Hence it acquires all the feeling of familiarity of a true memory-image, and so far it is liable to be mistaken for one. With an adult thinker there is, of course, comparatively little danger. A man hears an incident vividly described—so vividly that he almost feels as if he had been present. But when he recalls that incident, he recalls along with it the circumstances under which he heard of it, and his own feelings on hearing the description. These things forbid his regarding the incident as part of his own past. He also remembers enough of the course of his past life to show that it was impossible he could have been a spectator of the incident. Again, the grown-up thinker constructs a scene purely out of his own fancy, in which he figures himself as an actor. But in recalling such a scene, the memory of himself as constructing the scene is also present, and prevents belief in its reality in his own past, however often he may dwell on the fancied action.

This happens with a normal, healthy, developed intellect. But mark what happens when the intellect is of a different type. The familiar incident recurs to memory, but its setting or fringe of relation to reality is forgotten. There is nothing to prevent the belief that it actually occurred in the thinker's own experience. So King George may come eventually to believe that *he* led the troops at Waterloo.

In the same way the castle-building child comes to inhabit one of his own air-castles, and reports as facts some of the favourite ideas of his active imagination. This is done at first in all seriousness and honesty. Later, it is true, he may tell wonderful stories for the sake of effect or for other reasons, but in the beginning it is a perfectly natural error of thought. If the little romancer has a fairly good memory and a fairly logical type of mind, you may be able to lead him backwards, step by step, through the recent past, and show him that his story is impossible; that he must have mistaken the fancied for the real. If you can do so, his feeling is that he has been deceived somehow—not that he is a deceiver. He feels the puzzle of reality contradicting appearance, just as a kitten may be supposed to do in its first interview with its own reflection in a mirror.

(To be continued.)

THE N.U.T. CODE.

WHAT Messrs. Yoxall and Organ do not know of the Code, and of the multitudinous circulars, minutes, instructions, and pronouncements bearing thereupon, is certainly not worth knowing. And here for the nimble shilling is the whole of their knowledge scheduled, indexed, and annotated for the behoof of the English primary teacher, who, judging from the circulation of the *N.U.T. Code* during the seven years that it has been in existence, is not slow to avail himself of the boon.

What strikes us most, in going through the three hundred odd pages of the work from the hands of Messrs. Yoxall and Organ, is its encyclopedic character. From the new Minute on Higher Education down to a list of the Continental centres, giving holiday courses in modern languages, all is set out in such admirable order and perspicacity that he who runs may read. It is an axiom in law that *ignorantia juris non excusat*; and with respect to the law on matters connected with primary education, the *N.U.T. Code* makes ignorance truly unjustifiable, if not absolutely culpable. The publication is one of which the National Union of Teachers may justly be proud.

Our Monthly Retrospect

EDUCATION IN ENGLAND.

N.U.T. NOTES, ETC.

BY T. B. ELLERY, F.R.G.S.,

President of the National Union of Teachers, 1895–96.

The York Conference. THE York Conference, in spite of one or two drawbacks, must be pronounced a success. One of the drawbacks was the Executive dinner, of which few had a good word to say. Yet even here there was one redeeming feature—the brilliant speech of Mr. Cohen, to whom was entrusted the toast of "The Ladies." By common consent, this excellent piece of humour and pathos was *the* speech of the week. No good purpose would be served, at this distance of time, in reviewing the events of the week; still, a word or two on a few points may not be out of place. And, in the first place, honour to the president, Mr. Marshall Jackman, whose manly address and thorough grip of business won golden opinions in every quarter. If he had a fault, it was that he now and then kept his voice at too low a pitch—so low, in fact, that representatives at the back of the hall were compelled to shout, "Speak up." But the genial president took the hint in his usual happy manner, and "spoke up" accordingly. His mastery of detail, splendid resource, and strict impartiality mark him out as a man well fitted to fill the chair of the Union. Very wisely, he took only one subject for his presidential address; and equally wisely, in view of the passing of the Superannuation Act, he selected "Reasonable Security of Tenure" as his text. It was an admirable effort, moderate in tone, skilfully arranged, and absolutely convincing. With such a lead as this address gives, the Executive should be able to deal an effective blow during the coming year. Public meetings should be held, and there ought to be a debate in the House. But Mr. Jackman may safely be left to suggest his own course of procedure. In the meantime, best wishes for a very successful year at Russell Square.

Mr. Blacker as Vice-President. AS THE PRACTICAL TEACHER said some months ago, Mr. Blacker's election was a foregone conclusion. Still, no one, probably, was prepared for the ease with which the Brighton champion reached the winning-post. His total of 13,711 votes nearly equalled the aggregate poll of the other competitors, Messrs. Croft, John, and Coward: 13,711—14,954. It was a remarkably popular victory, too, though the defeated candidates are all "strong" men, and all held in high esteem. Mr. Blacker's record is an exceedingly creditable one, both locally and in connection with the Executive of the N.U.T., so that his victory is thoroughly well deserved. The Brighton teachers have arranged a complimentary banquet to him at the Royal Pavilion, on Friday, May 25, with his Worship the Mayor of Brighton in the chair. At the request of the vice-president and the Executive, the present writer will attend on that occasion, and he will thus be able to give a few particulars of the interesting function in the next issue of this journal.

Great Yarmouth in 1901. Some two or three years ago a note appeared in these columns that Great Yarmouth would be a suitable town for Conference in 1901. The suggestion has been adopted, and doubtless, if the weather is favourable, the representatives will, on the whole, be satisfied with their choice. Whether the hotel accommodation is as good as that to be found in larger towns is, of course, open to doubt, but it is quite certain that the Great Yarmouth teachers will make the best arrangements possible.

Given fine weather, those who have never visited the eastern coast will be delighted with their visit. If, however, Easter is accompanied by wind and rain—well, the less said about it the better! East Anglian committees will soon be at work, and probably local associations will within a few weeks be called upon to assist in raising a grand amount for the 1901 Purse. And with all the increased responsibilities of the Orphan and Benevolent Committee, such an amount is essential if the work is to be done with any degree of efficiency. Will not every teacher in the land guarantee, say, 5s., 7s. 6d., or 10s.? This sum can easily be raised by a concert or magic-lantern exhibition; consequently there is no excuse for any one whose name does not appear in the list. East Anglian teachers especially must be up and doing.

M. Desmedt and M. Dubus. N.U.T. Conferences are not complete without the presence of the ever-popular Van Dam and Desmedt, both of whom speak English fluently and well. On this occasion M. Van Dam came in his private capacity—the reason will be readily understood—but the welcome extended to him was as cordial as ever. M. Desmedt, with his cheery laugh and particularly happy manner, made a host of friends, who all hope to see him again at Great Yarmouth. He has sent me a letter, evidently with a view to publication. "Our popular president," he says, "M. Dubus, representing a body of 4,500 teachers of North France, and the vice-president of the French pedagogical press, asked me to tell you how much he admires your spirit of mutual tolerance and respect. He was charmed with the calm, the order, the discipline of your meetings, worthy of being imitated by any public assembly. In this friendly gathering of teachers our president has enjoyed a week of the greatest pleasure and profit, and it is therefore in his name, as well as in mine, that I wish continued success to your Union, so admirably organised, so admirably officered.

"Our president and executive take the warmest interest in all that concerns education in England and the admirable Union of English teachers. They are glad that in the course of the year the Union has gained in number, resources, repute, and power.

"Our association hopes that the day will not be far distant when the Superannuation Scheme will be improved, and when no widow or child of an English teacher will want any of the decencies of a civilised life. It hopes for a satisfactory and speedy solution in England of that burning question of security of tenure (so lucidly treated by Mr. Jackman in his inaugural address). You have a right to perfect justice, to a due reward for your labours. The time is far away in France when a teacher must leave his appointment because the two posts of schoolmaster and organist must be united in one person."

In another note, M. Desmedt says M. Dubus is a noble character, a learned man, and most devoted to the cause of lay and unsectarian teaching in France. As president of the Teachers' Association of the Nord, as editor of the *Bulletin de l'Association des Instituteurs et Institutrices du Nord*, and as vice-president of the association of the French pedagogical press, M. Dubus has met with very great success. It only remains to be said that if M. Dubus decide to visit the Great Yarmouth Conference in 1901, he will receive the heartiest of welcomes.

Next Month:

NEW PREPARATION COURSE
for
LONDON MATRICULATION, JUNE 1901.

A Scheme for Voluntary Schools. At a Conference of the Rural Deanery of Luton, held in St. Mary's Hall, Luton, on May 7, the writer of these notes gave an address, at the

request of the rural dean, on the future of denominational education in England, and concluded by moving a resolution in favour of a scheme which he had drafted, and which was in great part based upon several existing schemes. Briefly, the clauses run as follows:—

1. Establishment of county (or district) educational authorities.
2. All Government grants to be paid to this authority, who shall have power to levy an educational rate over the whole county or district for maintenance of all primary schools in that county or district.
3. All schools (Board and Voluntary) to be financed by this authority according to need, an estimate of probable expenditure being submitted by the local managers at the beginning of each year.
4. Denominational schools to be managed by a committee comprising—(1) the trustees for the time being; (2) representatives of the church to which schools belong; (3) representatives of parents; (4) representatives of the local School Board, or Town Council, or District Council; (5) representatives of the county (or district) educational authority. (This committee might be responsible for one school or group of schools.)
5. Meetings of this body to be open to the public, under the same rules and conditions as meetings of the School Board.
6. Teachers responsible for the denominational religious instruction to be of same creed as denomination to which school belongs—due provision being made for those children whose parents desire either another form of religious instruction or no religious instruction at all.
7. Funds needed for capital expenditure on school buildings to be provided by the denomination to which the school belongs.
8. Trustees of denominational schools to have power to borrow from the local authority or some other authority, on the security of the school buildings, etc., any sum needed for the improvement, enlargement, or reconstruction of the buildings required by the Education Department—the amount to be repaid in twenty or thirty years.
9. No business to be transacted by the local committee of which four days' clear notice has not been given to the members of that committee.
10. In case of dismissal of teacher by local committee (there must be a two-thirds majority in favour of dismissal for the notice to be valid), such teacher to have right of appeal to the county (or district) educational authority, and, if necessary, to the Education Department.

In the course of the discussion which followed, some objection was raised by one or two of the clergy to Clause 4, and an amendment was moved to delete (3), (4), and (5) in that clause. This amendment was, however, withdrawn, and another moved in favour of an adjournment of the debate. This was eventually defeated, and the motion (which was as follows: "That this Conference heartily approves the scheme submitted, and requests the secretary to send copies to the Lord Bishop of the diocese, the Archbishop of Canterbury, the First Lord of the Treasury, and the member for the division") was carried by a substantial majority, and amid applause from both clergy and laity.

Insurance of Premiums under the Superannuation Act. The joint-committee of the N.U.T. Executive and the Teachers' Provident Society is making very satisfactory headway with its scheme for securing the return of the premiums paid in connection with the Superannuation Act of 1898. A new and revised circular has just been prepared, which it is hoped will soon be in the hands of members of the Union. It is not too much to say that the committee offers terms which no teacher who has the welfare of his family at heart can afford to reject. Death may come, and of course will come to many, before age sixty-five is reached, and then all the payments made to the State will be lost. There will be in these cases no benefit to the widow and children from the Superannuation Act. The scheme now submitted makes provision for the return of all the premiums paid, in the event of death occurring before the pension age is reached. Surely, then, every member of the Union should seriously consider whether it is not his duty to insure with the Provident Society. At any rate, it costs nothing to write to Russell Square for particulars. It should also be remembered that an entrance fee will be required from all who join after the close of this year.

The first Meeting of the Council of the Funds. The first meeting of the new council has been held, and an excellent start has been made. Mr. Baxendale was elected chairman, and Mr. Hole, of the Executive, vice-chairman. Two better selections it would not be possible to make. Both have thrown themselves into the work with a zeal and thoroughness which augurs well for success during the coming year, and it will not be their fault if there is anything approaching failure during their time of office.

The retiring chairman, Mr. J. Hodge, has rendered splendid service to the funds, never sparing himself at any time in his intense desire to make the administration of the funds a complete success. A word of praise, too, to the assistant secretary, Mr. Bickerton, who has had a difficult task, and who labours early and late to give satisfaction.

TECHNICAL AND SECONDARY EDUCATION.

The Board of Education. On the first of April the Education Department had ceased to exist, and the Board of Education had taken its place, embracing also the functions of the Science and Art Department, and of the education side of the Charity Commissioners. Up to the time of writing, however, no public intimation has been made of the progress of organisation of the new Department, with the exception of the appointments to the principal secretaryship and assistant secretaryship of the Board. Of the character of the Consultative Committee, its size and its functions, nothing is yet known. In the meantime sectional legislation goes on. The minute on higher primary schools, introduced to supplement the new Code, while conceding something to the demands of those who have been persistently working for the higher education of the people, does not by any means satisfy either them or the managers of schools, who are unable, from the sparsity of population, or for other reasons, to do other than conduct higher classes in the ordinary elementary schools. It is somewhat difficult to determine what place in the scheme of education these new higher primary schools will take. Are they meant to supersede the schools of science? If so, we think it would be a calamity to destroy the connection between the elementary schools and the schools of science, which have done so much of late years to feed the university colleges and provide students for real technical schools of chemistry, engineering, textile and allied industries. A real Minister of Education with a good knowledge of present conditions, a broad outlook on the whole field of education, and a masterful disposition to aid in carrying out the plans he might formulate, would be a godsend at the present moment. Notwithstanding the felicitations of the President of the Board, we cannot look upon Sir John Gorst as a heaven-sent minister.

The Constitution of Local Authorities. Differences of opinion still exist on this subject. The N.U.T., the more ambitious of whose members are vitally interested in the unification of educational authorities, at the York Conference returned to its old love—the *ad hoc* selection of a county authority. Whatever may be the advantages of a county authority popularly elected for all purposes, it would appear, considering the multiplicity of details, the varied character of the requirements of the counties, and, above all, the experience gained on public bodies in the administration of education, that the work justifies the election of a separate body to superintend the whole of the education in any given area. When it is remembered that there are above 2,000 separate public authorities, as well as some 14,000 independent sets of managers, controlling public elementary schools alone, in addition to the numerous secondary school governing bodies, it seems a great waste of energy, money, time, and educational efficiency to allow these to continue; and it would be well if all educationists could agree upon a course to be recommended to the Government. The line of least resistance is, however, most likely to be adopted, and we

shall probably hear of the jurisdiction of the committees of the County Councils being extended to all classes of schools not at present under popular control. Meetings of various associations have occurred since the last issue of these notes in THE PRACTICAL TEACHER. Among others, the National Association for the Promotion of Secondary and Technical Education has passed a resolution—"That the time has now arrived for further legislation for completing the organisation of secondary education upon the general lines recommended by the recent Royal Commission." No legislation, however, may be looked for during the present session of Parliament, nor probably during the existence of the present Parliament at all, rumours of a dissolution growing in volume almost every day.

The Joint Committee of the London School Board and City and Guilds Institute. The great development of manual training, and the experiments in metal-work, laundry work, and housewifery, under the London School Board, owe their impetus to the work which has been carried on by this committee, which is composed of members of the Board, of the City and Guilds Institute, and representatives of the Technical Education Board of the London County Council. Centres for woodwork, metal-work, and other branches of technical work applicable to children in elementary schools, were established chiefly by the liberality of the Drapers' Company. The help thus rendered is gradually being withdrawn, and after the present educational year the committee will probably cease to exist. Its work has been of a pioneer and experimental character, and has led to the marvellous development of manual training which the past few years have witnessed in all classes of schools. The prizes given for success at the various centres were given at the Drapers' Hall, on the 23rd May last, by the Marquis and Marchioness of Londonderry. Since 1888, when the first centres were established, and 580 scholars were provided for by the Joint Committee, the subject has been introduced into the Code, and accommodation for woodwork alone is now provided for nearly 54,000 children in London, in addition to cookery, laundry, and housewifery centres.

Pupil Teachers' University Scholarship Committee. Toynbee Hall, among its other beneficent activities, has a committee so named. It gives eight or ten scholarships annually to Queen's scholars high on the list who wish to take advantage of the education and training to be obtained at the universities. It has lately awarded nine such scholarships, tenable at Oxford and Cambridge, to four pupil teachers from London, two from Bristol, and one each from Leicester, Cambridge, and Sunderland. They are as yet confined to men only. It has been suggested, in order to give opportunities to women at the various universities where they can obtain degrees, or sit at examinations qualifying for a degree, that sex should not disqualify for these scholarships. Some years ago it was suggested, as one of the reforms necessary at the older universities, that some of the open scholarships might be so divided as to provide with the Queen's Scholarship almost sufficient means to maintain many more students of this character at these places of learning. It needs an ardent reformer to carry out the suggestion.

The Birmingham University. The Royal Charter establishing the new Birmingham University was issued early last month. Mr. Chamberlain is the first chancellor. It starts upon its career well endowed—with constituent colleges, and well adapted for giving an education peculiarly fitted for the locality in which it is placed. The development of the higher education would not have been possible but for the work done in the higher-grade, technical, and secondary schools and colleges of the district. It is impossible to calculate the good done by the establishment of the college by Josiah Mason, the penmaker of Birmingham. The University of Wales, Victoria University, and now Birmingham University, are all the products of the last twenty years.

The New London University. For the first time, presentation day of the London University found the members on the 9th of May in their new home—the Imperial Institute. A large and representative gathering witnessed the presentation of diplomas, exhibitions, and medals. Earl Kimberley, the chancellor, was in the chair, and was accompanied by the Prince of Wales, Sir Henry Roscoe, and others. Since the opening of the degrees to women in 1893, there have been 9,599 women candidates for matriculation, and they have taken degrees, including eleven as lady doctors of science, three as masters of surgery, twenty-one as doctors of medicine, and ninety-six as masters of arts, besides numerous other distinctions.

EDUCATION IN SCOTLAND.

E.I.S. NOTES, ETC.

BY JAMES PATERSON,

Ex-Vice-President of the Educational Institute of Scotland.

Paris Exhibition. DR. DUNN, Her Majesty's Inspector of Schools for Fifeshire, has been appointed official representative of the Scotch Education Department at the Educational Congress to be held in Paris during the present International Exhibition.

Fifeshire Branch, E.I.S. A meeting of the Fifeshire Branch of the E.I.S. was lately held in Dunfermline, for the purpose of discussing the Bill referred to in the preceding paragraph. The chairman of the Dunfermline School Board—Mr. Andrew Burt—read a paper introductory to the discussion. The following resolution was in the end agreed to: "That this meeting expresses satisfaction with the proposal to place secondary and technical education under one authority, to include educational experts in the constitution of that body, and to consolidate the various funds available for higher education." In regard to the dismissal of teachers, a resolution was adopted declaring the proposal contained in the Bill to be illusory and insufficient, and suggesting that the local Higher Education Committee should form a Court of Conciliation. The proposal to raise the school age was cordially approved of, but the placing of the power to grant exemption in the hands of School Boards was deprecated.

The New English Minute. The new Minute of the English Board of Education, providing for the reorganisation of a number of the elementary schools under the style of "higher elementary schools," is of much interest to Scotland, on account of the liberal grants to be paid as compared with those obtainable in advanced departments under the Scotch Code. The fourth standard is to be the passport to these schools, and a grant of twenty-seven shillings may be earned for the first year, rising in the fourth year to sixty-five shillings. At the corresponding stages of advancement in Scotland the grants would range from twenty-two to fifty shillings. Scotch members of Parliament may, it is hoped, be trusted to see that a similar increase is made in the grants of the Scotch Education Department.

The Lerwick Dismissal. The Lerwick School Board election has resulted in the rejection of most of the majority of the late Board which dismissed Mr. Young. This is surely the very strongest evidence that a gross injustice has been perpetrated, and that some security against the arbitrary power of School Boards is absolutely necessary.

The Departmental Certificate of Character. The utter worthlessness of the Departmental certificate of character, which Lord Balfour's Bill proposes as a remedy for the grievance of wrongous dismissal, must be patent to all, as it certainly is to teachers themselves. It is small consolation for a man who has been wrongously dismissed from a situation worth, say, £300, to secure by means of such a certificate an appointment worth perhaps a third of the salary formerly enjoyed. As has been well pointed out, too, Lord Balfour's proposal would aggravate the present evil rather than otherwise, inasmuch as it would prove a temptation to Boards to dismiss teachers more freely than ever, in the professed belief that the Departmental testimonial would right every real or fancied wrong. Something more than this is wanted, and the teaching profession will not rest satisfied till it is granted.

Glasgow Exhibition of 1901. The Education Committee of the International Exhibition to be held in Glasgow in 1901 is endeavouring to arrange a systematic and complete exhibit illustrating the various phases of educational work in Scotland; and a sub-committee has been appointed to collect suitable material from schools of every class and grade. The committee expresses its belief that this department of the exhibition will not merely be a source of interest to the visitors, but will also prove of special service to the cause of our national education. The exhibits are to be classified under the following heads:—*A.* Accommodation and equipment (photographs, plans, etc.); *B.* Constitution and organisation (prospectuses and time-tables); *C.* Classroom work of pupils; *D.* Manual work of pupils; *E.* Special work of pupils; *F.* Illustrations of drill, swimming, and school games; and *G.* Educational statistics.

Religious Instruction in Schools. A deputation from the Representative Church Council of the Episcopal Church of Scotland recently waited upon the Secretary for Scotland, to lay before him "the desire of the Council that facilities should be given for the instruction of Church children in Board schools by accredited teachers." Lord Balfour pointed out that the matter was one which did not lie with the Department, but with the local authorities. He at the same time, however, frankly stated that if he were a member of a School Board, he should do his utmost, on the demand being made, to see that religious instruction was given in conformity with the desire of any church making the request, provided there was a reasonable number of parents asking it, and having a right to ask it, for their children.

Death of two Ex-Presidents. Death is still busy in the ranks of the Educational Institute, and two more ex-presidents have lately gone over to the majority—namely, Dr. Sewell, Pollokshaws, and Mr. Marshall, Lasswade. Both gentlemen were well known and highly respected, not only by their brethren, but by the people amongst whom they had laboured so long and so successfully. Than these two lamented gentlemen few have done more, by their ability and upright character, to gain for the body of teachers recognition as a profession. These two deaths, added to those of Dr. Ross and Dr. Campbell, bring up the death-roll of ex-presidents to four within the past year.

Aberdeen Branch, E.I.S. The business at the recent periodical meeting of the Aberdeen Branch of the Institute was a discussion on "An Ideal City Branch of the Institute." Papers were read dealing with its political aims, its educational value, its social aspect, and its relation to country members. The papers and the discussion went to show that better organisation in the general body is necessary; that the Institute is really a society for the advancement of knowledge; that the social side is not sufficiently cultivated in the Aberdeen Branch; and that the Branch had failed in its duty to country teachers.

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NOTES FROM THE NORTH.

New Code for Evening Schools. Contrary to general expectation, the new Code for Evening Continuation Schools contains little that is fresh. The recent circular on military drill in schools has no doubt had much to do with the introduction of Suitable Physical Exercises and Military Drill as additional subjects under Article 2. It is evidently contemplated by the note to this article that such instruction may be given in drill halls or gymnasia, for it points out that such instruction may be given elsewhere than on the school premises.

The school year has been extended from 30th April to 31st July. This is due, we think, to the provision for compulsory evening school attendance, as found in Lord Balfour of Burleigh's Bill on higher education, recently introduced in the House of Lords. If it means that the evening school year is to be extended, then it will entail some considerable hardships on School Boards in securing a staff willing and able to undertake a protracted session from September to July. The seventeen-and-sixpence limit should have gone by the board in view of this extension.

In other respects the changes are of a minor character; but we feel that after the passing of Lord Balfour's Bill, if it does pass, new provisions will require to be made, so that before the present Code comes into operation there may be important modifications.

Distribution of Sum available for Secondary Education. Paragraph 10 of the Minute of June 10, 1897, has been somewhat modified by the recent Minute of 30th April. Payments are now to be made on schools that are specially recognised advanced departments (Article 21 of the Code) attached to State-aided schools, or as higher-grade schools or departments (chap. ix. of the Code); and subsidies paid in respect of such advanced departments, or higher-grade schools or departments, except under conditions expressly sanctioned by the Department, are not to exceed the annual sum of £100.

Instead of (*d*) under that paragraph—namely, "No payment shall be made in respect of instruction or passes in specific subjects under the fourth schedule of the Code other than such as shall be approved by the Department as secondary subjects, nor in any of those subjects lower than the third; nor shall payments be made in respect of passes in lower arithmetic at the Leaving Certificate Examination"—there has been substituted: "No payment shall be made in respect of the attendance of pupils who have not obtained the merit certificate, or reached an equivalent standard of attainment; nor shall individual payments be made in respect of success at examinations other than the Leaving Certificate Examination, or in respect of passes in lower arithmetic at that examination."

This is a very important alteration, and will considerably widen the field of application of such grants.

New President and Vice-President of E.I.S. The first election of president, vice-president, and committee of the Institute, under the new rules, has taken place, and the result was declared on Saturday, 12th May. The interest taken in the election has been greater, we believe, than on former occasions.

For the presidentship the voting was as follows:—

A. C. Mackenzie, Maryburgh	1,298
Alex. Menzies, Kirriemuir	830
George Rae, Wamphray	668

For the vice-presidentship the result was:—

George Lowson, M.A., Stirling	839
S. M. Murray, Edinburgh	819
J. Matthew, Corstorphine	559
Jos. Ingram, Wishaw	502
Hugh Munro, Penicuik	134

As a result of the voting the Congress at New Year will likely be held in Inverness.

Higher Education Bill. On Thursday, 10th May, Lord Balfour of Burleigh took the second reading of this Bill in the House of Lords. He pointed out that the opposition to the Bill had mainly gathered round three points

—namely, the constitution of the proposed local Higher Education Committees and their relationship to the Scotch Education Department, the proposal to have a rating power for higher education, and the method in which it was proposed in the future to divide and distribute the central funds amalgamated for the purpose of higher education.

He was in a conciliatory mood, and there can be little doubt that the prospects of the Bill becoming law have been very much improved. To the second of these objections—the proposal to have a rating power—most consideration has been given, especially by the cities of Edinburgh and Glasgow; and we fear that this proposal is likely to go by the board. In lieu of the power of rating, it is suggested that recourse should be had to the sum, which this year amounted to £161,912, distributed among the county and town councils for the relief of rates, or to be spent "under any scheme of public utility framed by them." Higher education, though not mentioned in the Act, is looked upon as being a "scheme of public utility," and to this purpose there is at present devoted £1,060. It is proposed to draw upon this equivalent grant to a considerable extent, to obviate the necessity of rating.

Educationists would like to see the rating clause still kept in the Bill, but there seems to be little likelihood of this.

The committee of the Institute have, after careful consideration and examination of the provisions of the Bill, resolved on the following:—

"1. That the Bill as a whole deserves the approval and support of the Educational Institute of Scotland, but that on the general question of local educational administration the Institute is of opinion that a more satisfactory solution is to be found only in the division of the country into large areas, each area to have a board elected for all purposes of education—elementary and secondary.

"2. That the power of rating by the proposed Higher Education Committees is essential for all the purposes of the Bill.

"3. That the Institute is strongly of opinion that the proposed Departmental certificate would be no protection against unjust dismissal, and that it would probably be injurious, rather than beneficial, to teachers; and, accordingly, they recommend the deletion of Clause 13, and should desire that the right of an appeal to the Department or to the proposed Higher Education Committees should be provided.

"4. That the Institute views the provisions of Section 14 of the Bill with favour, regarding them as a distinct advance on existing arrangements for prolonging attendance at school, it being understood that pupils set free at the age of twelve from day-school attendance should be subject to compulsory attendance at evening continuation schools up to the age of fourteen.

"5. That provision should be made in the Bill for establishing a pension fund for teachers in secondary schools.

"6. That the Institute, believing it possible that the proposed Higher Education Committees might desire to make the payment of fees imperative in many if not all schools providing higher education, recommend that the consent of the local managing bodies be required to the imposition of fees in schools now providing free education.

"7. That payments for individual pupils in all classes of schools should be made only in respect of the attendance of pupils who have obtained the merit certificate or reached an equivalent standard.

"8. That a definite amount of the annual grant-in-aid made to counties and burghs under Section 2 (5) of the Education and Local Taxation Account (Scotland) Act, 1892, be added to the proposed Higher Education (Scotland) Fund.

"9. That the Institute highly approves of the bursary provisions of the Bill, and recommends that it should do its best to ensure that they are of sufficient amount to meet the reasonable expenses of pupils away from home, and that they are so distributed that no district will be at a disadvantage as compared with other districts."

FOREIGN NOTES.

BY E. E. FOURNIER D'ALBE, B.SC., A.R.C.S.

An interesting lecture on the principles and prospects of "child-study" was delivered at the last meeting of the Friends of National Education at Hamburg by Herr Rost. The young science, founded by Darwin, and advocated in Germany chiefly by Preyer, has at present its most zealous adherents in America. Much worthless material has been collected by untrained amateurs, and this has tended to bring the science somewhat into disrepute. The lines of investigation are three in number, consisting of the study of children's utterances and gestures, the examination of adult memories of childhood, and direct experiment. Among the matters subjected to experiment so far are the distinction of colours, the association of ideas, and mental fatigue. One of the chief results of the last-named investigation is that bodily exercise cannot be regarded as an antidote to mental fatigue, but rather as an aggravation. In many points, the biogenetic law that the development of the child is a summary of the racial development has been confirmed. The child shows propensities usually exhibited by primitive races. This is seen most clearly in the development of the language. The sounds of *g* and *k* are difficult for children. The South Sea Islanders did not know them before their intercourse with Europe began. The psychology of the child is destined to be of the same elementary importance to general psychology as embryology has been to anatomy. But it is only in its infancy as yet.

* * * * * *

One of the most useful of the works undertaken by the Association des Instituteurs pour l'Education et le Patronage de la Jeunesse is the establishment of part-paying holiday colonies for the children of the more prosperous working-classes of Paris, who would like to secure for their children the benefits of country air without accepting any help which savours of charity. The last three years' working of these colonies has proved very satisfactory. The total expenditure per child for a stay of three or four weeks, including railway fares and maintenance, is on an average 80 francs. Of this sum, 30 francs are charged to the parents, and the rest is borne by the society. Berck-sur-Mer, Villeneuve-sur-Bellot, Bleneau, and Domfront are among the resorts chosen. Some twenty-four male and female teachers volunteer to conduct and care for the children, whose fat and rosy cheeks on their return bear eloquent testimony to the benefits derived from the outing.

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Under the title of "The Teaching of the Future," an enthusiastic appreciation of Seignette's "École Moderne" appears in the *Journal des Instituteurs*. The series of school-books referred to is better known under the name of the Concentric System. Its distinguishing feature is that all the subjects comprised in the Government syllabus of the first three years are treated simultaneously in all the books, but the treatment varies in fullness of detail according to the standard it is intended for. The object of this arrangement is to solve the problem of rural schools which have only one teacher, and it appears to be successfully solved.

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The extraordinary weight attached to physical education in the elementary school system of Japan is its most distinguishing feature. In the preparatory schools, children from six to ten years of age are instructed in reading, writing, arithmetic, moral law, and gymnastics. In the elementary schools, for children from ten to fifteen years of age, gymnastics is one of the most important subjects. During the first three years three hours, and during the last two years five hours per week, are devoted to gymnastics. The only subjects which are on a par with it are Japanese (five hours), and foreign languages (six hours). In the higher schools, for boys from fifteen to nineteen years, it occupies the first place, with six hours per week. It consists of the ordinary drill and apparatus work of the German schools, but the true

inwardness of this predilection for physical training becomes apparent when the military exercises become its most important part. All the elementary military evolutions are practised, and target-shooting, army service, and fortification are taught. In fact, the school is made the nursery for the barracks, and the male pupil is practically a recruit before he leaves school. It is evident that Japanese statesmen are not going to allow the military prestige of Japan to become a fiction. But they may find that the evils of conscription are considerably enhanced by making the school into a barrack-room.

THE COMMON SCHOOLS OF RUSSIA.

III.

BY OUR SPECIAL CORRESPONDENT.

WE have briefly reviewed a few general questions which affect primary education, especially in Russia, and have given some account of how the curriculum appears on paper and in the reports to headquarters. In all places where money is procurable, some approximation is undoubtedly made to these paper ideals. Let us now see what a "school" *may* be in Holy Russia, all the due forms continuing to be observed in the reports, and no hint appearing to show the real state of the case, which, indeed, is in most instances due to abject poverty—a poverty in extent and kind almost inconceivable to us. The more or less "model" schools, of which there are many in such provinces as those of Moscow and St. Petersburg, and indeed wherever money is comparatively plentiful, require no special description. Except that the style of teaching is purely mechanical, and the system generally hidebound and inelastic, these schools may compare, all things considered, with the primary schools of much older nations than Russia. They are, however, but a very small percentage of the total number of "schools" existing and working, at least on paper, throughout the vast extent of the sparsely-populated Russian Empire. It will interest the English reader to picture rather the irreducible minimum in the matter of "schools" than the comparatively few superior establishments which are supported by wealthy public or private bodies in and about the great centres of population, commerce, and industry.

Conceive, then, a long, straggling double row of detached weather-beaten hovels, thirty yards apart, the space between them forming the "street," the single "street" of a poverty-stricken village extending for a mile or more in length. Country "roads" in Russia are always abnormally wide, to allow of the wayfarer choosing a comparatively passable route, and the course pursued at most times of the year is precisely that of a ship making short tacks in a head-wind. The month is October, the beginning of the school year and of the autumn "break-up" of the weather—that is to say, the country roads are impassable for vehicles, being three or four feet deep in mud, with every here and there holes and gullies, half water and half mud, sufficient to engulf cart and horse together. For a "road" in Russia means no more than the direction in which traffic moves from one place to another, and in no wise necessarily presupposes any attempt at metalling of *any* kind. On either side this slough of a street will be, so far as the village extends, a practicable footwalk, some twelve inches wide, made in the natural course of things by the clumsy, well-tarred high boots of the peasants as they pass to and from the church, the bath, the school, the wells, etc. Where very bad, indeed, this path will be *repaired* by flinging down a few bundles of twigs or a rotten old pole "lifted" from the handiest fence, or even an armful of straw. At one end of, and at some distance from, this typical street stands a dilapidated *izba*, which serves for the school-house. From its position, so far away from the nearest dwelling, and its general appearance, it would seem to have served its time as the village bath-house, and to have been relegated to school uses when necessity compelled the *mujiks* to erect a better bath-house for their common use.

The view inside is even more depressing. A room, some 20 feet by 15, low and dark, with a filthy, hard-beaten clay floor, and walls and ceiling of the natural wood, with many a gap in the hempen calking between the unsquared logs; a huge tiled stove flush with one wall, and occupying a good half of it from floor to ceiling; and a couple of the tiniest of windows, glazed with microscopic scraps of the lowest quality of glass, barely transparent even when clean, and in its present state permitting one to look the mid-day sun fearlessly in the eye—such is the interior of the "school." The only respectable piece of furniture about the place is the icon, or holy image, in one corner near the ceiling, and that might have cost perhaps some six shillings when new. On the walls are a few tawdry, unframed, coloured prints of scenes from Scripture and the lives of the saints, a dozen gaudy daubs panelled on to each sheet. A few of the roughest kind of benches, with a three-legged stool as rough for the teacher, complete the furniture of the school. On one window-sill lie a few slates, or rather pieces of slate, some disorderly scraps of paper covered with large-type print, and recalling rather the dust-heap than the book-shelf of a school, and other odds and ends. There is no blackboard, no globe, no map, and—no birch or other equivalent aid to learning, for corporal punishment is unknown in Russian schools of all grades.

Of the class attending such a school the illustration which appeared in our last issue, together with that given below, gives a good idea. Two of the children, it is true, evidently belong to a steady-going peasant, and are certainly well-off; for both the boy and the girl are dressed *en règle*, even to the tasselled waist-cord of the boy, and, above all, each is possessed of a pair of boots. But among the scholars will also be wretched little tatterdemalions, covered

with rags and vermin, barefoot and bareheaded, half-starved, and blunted in understanding by hard treatment, of which the signs become painfully apparent, in particular after each church holiday, when huge quantities of *vodka* are consumed, greatly to the advantage of the imperial exchequer, in every village of the Russian Empire.

The teacher of this delectable school is a wretched old man who was once a "writer" or clerk (a post of some importance in an illiterate community) in the office of the local commune, but being dismissed by higher authority for peculation and other less common and less pardonable offences, has drifted to his present post—a *vodka*-sodden rascal who is content to keep a roof over his head under pretence of teaching the village children to read and write. When he is sober, some progress is made in the alphabet,

and a few sharp boys are even heard to read from the scraps of odd leaves aforesaid. When the inspector comes round (a rare event), the "school" will have glibly learned by heart the piece to be read, and will, in a body, fail miserably should that official, with the over-zeal of the indiscreet, attempt to pry further into the acquirements of the youngsters. But a strict and conscientious fulfilment of duty is no mark of the Russian official of any grade, and the chances are that all goes smoothly; so that the subsequent report to headquarters gives nothing but satisfaction to the bureaucrat, whose actual knowledge of his poorer fellow-subjects is probably very much less than that possessed by the Indian civil servant of the alien races over whom he rules. At any rate, it is charitable to suppose so, for otherwise the only explanation of the existing state of things in Russia—not by any means only in reference to schools—is that the bureaucrats of St. Petersburg are chiefly engaged in consciously whitening the outside of a sepulchre. And this latter view is held by many who know Russia well.

The above is an unfavourable specimen of a Russian common school, but it would be a falsehood to call it an exceptional case, and a gross exaggeration to say that it is by any means an unusual one. It is well to give it as a corrective to paper statistics of "schools" in Russia. The place *is* a school, and teaching—of a sort—is sometimes done in it. What more can be demanded! In the reports to headquarters it counts as a school, with scholars some of whom pass and some don't—quite in the regulation way. In point of fact, it is the best that can be done in the circumstances, and at any rate it is better than nothing at all. The bright boy, at least, will get some clue to the mysteries of print, and in an empire like Russia it is no small matter that a select few should be able to get though it be only one foot set shakily on the lowest rung of the ladder of learning.

The Russian Government, including the Church, expends some four millions sterling per annum in education (the contribution of the wealthy Orthodox Church being considerably less than one-quarter of this sum)—or about 9½d. per head of the total population of European Russia. As, however, this amount goes almost wholly to maintain the ten universities and the thirty or forty other institutions which confer equal civil rights with the universities, to say nothing of the gymnasia, the military and naval colleges and schools, etc., the surplus left for the needs of the *mujik* approximates very closely to *nil*.

Local efforts make up to some extent for the deficiencies of the central Government, notably so in the chief towns (some six in number), and in those provinces where the Zemstvo is specially active in the cause of education. But for the lingering suspicion in the minds of the old-fashioned bureaucrat that education spells "liberalism" (which is supposed to be the first step towards nihilism and anarchy), and the fact that the Zemstvo has the greatest difficulty in collecting its local taxes after the imperial taxes have stripped the common people bare, much greater progress would be made by these local bodies—the only class in Russia really in touch with the *mujik*. In wealthy and enlightened provinces like St. Petersburg and Moscow the time is not very far off now when it will be possible for every boy and girl to learn to read and write, but elsewhere matters are very different. Even in the city of Moscow, with the accumulating wealth of the empire continually pouring through it, the schools do not nearly provide for the education of the applicants. Be it noted that "universal compulsory education" is as yet only a dim vision; enough if provision be made for those who *want* to learn. And even this much—in spite of all statements to the contrary based on paper reports*—has not yet been accomplished anywhere in the Russian Empire.

The church schools have already been referred to. As the teachers in them are paid no more than from £8 to a maximum of £16 per annum, and the supervision is very lax indeed, abuses are especially rife. It is said that only twenty or thirty per cent. of the teachers in these church common schools are "educationally fitted for their posts"—a statement which may very safely be taken to imply that at least another twenty or thirty per cent. are not even able to read; these posts being often given to men occupying the offices of sexton, bell-ringer, church caretaker, and similar even less recognisable appendages of the local church establishment. A few years hence a better state of things may possibly be brought about, for only a month or so ago the Moscow Zemstvo was able to announce that after years of fruitless advances it had at last succeeded in gaining the consent of the church authorities to co-operate with it in the cause of popular education in the province of Moscow. These unions are, to be sure, sometimes no more than opposition and obstruction under the guise of friendly co-operation. If this turn out not to be the case here, a great step forward has been made. The enlightened example of the metropolitan of Moscow—of Moscow, the shrine of the Orthodox faith in Russia—will certainly have weight with the church authorities throughout the empire.

A great deal of what has been said above will doubtless seem incredible and absurd to the average English reader, and false to those whose knowledge of Russia depends on writers who have derived their "facts" from the *all-enduring paper*, and are not really acquainted with the people and the country. Russia is to this day a huge anomaly, where hardly anything is impossible. Would it be believed, for example, that not a couple of generations ago the chair of Philosophy at one of her universities was held by ——, a police inspector, a Russian police inspector—a Russian police inspector *of those days!* Yet such is the fact; and although so extraordinary an appointment could, of course, no longer be made in the higher circles of education, yet the lower grades still suffer enormously from similar acts of jobbery and ignorance. M.

* The Russian has a very pregnant saying—"Paper will stand anything!" No one in Russia believes very much of what he sees in written or printed reports, for the facts daily around him agree but indifferently with the smooth versions of things "on paper."

GERMAN education in the Prussian province of Posen is in a sadly declining state. An article by a Prussian schoolmaster which appeared some time ago in the *Pädagogische Reform* shows that German nationality is giving way before the greater vitality and keener racial feeling of the Polish element. Since, in 1872, Falk introduced his drastic school reforms, with their principles of centralisation and laicisation, the schoolmaster in Prussian Poland has become an official planted in a more or less hostile country for the purpose of preserving and extending German nationality. The task has not only proved anything but enviable; it has proved unsuccessful as well. It is true that illiteracy among the recruits has decreased somewhat, but the number of persons speaking Polish has increased to an alarming extent. Before 1872, Polish was on an equal footing with German in the schools. Since then it has been totally proscribed as a medium of instruction in the lower standards, except for religious instruction, and is only taught as a secondary subject in the higher forms. It has been proposed to impart religious instruction in German also, but the impossibility of inculcating religious truths in what is practically a foreign language is sufficiently obvious to prevent such a grotesque attempt at linguistic proselytism. The truth is that the Polish language and national feeling have survived the division of Poland, and Prussia is now reaping the fruits of that political crime in the decline of its own nationality in the annexed area.

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An additional educational congress to be held in Paris this year will be that on the teaching of drawing. It will sit from the 29th August to 1st September. There will be three sections—the first dealing with copying, geometrical drawing, and modelling; the second with the methods of teaching drawing; and the third with decorative and industrial drawing. The congress will be to some extent the outcome of the Sixth Annual Congress of Commercial Education which met at Venice last year. That congress, it will be remembered, proposed some very sweeping reforms in the modern language sections of commercial schools, tending to make the languages acquired immediately available for commercial purposes.

UR·CLASS·ROOM·AIDS·

NOTES OF A LESSON ON SLATE.

By WILLIAM DONE, B.A., *Head-Master of Brighton Pupil Teachers' School.*

See Supplement presented with this Number.

Articles of Illustration.—An old roofing slate, an unframed school slate, slate-pencils, some copper or galvanised iron nails used by slaters. If the lesson is given to an advanced class who know something about the chief rocks composing the earth's crust, the teacher might provide pieces of mica and quartz to illustrate the comparative hardness of slate, also a geological chart. For both classes, the diagram accompanying the lesson.

HEADS.	METHOD OF TEACHING.
I. Some of the chief physical properties of slate. (*a*) *Colour.*	From the various specimens shown, the children will infer that all slate is not of exactly the same colour. Though the prevailing tint is dark grey or *slaty colour*, yet some sorts are greyish-purple, while others are green. The colours, however, are all dull, and might be contrasted with the shining piece of mica.
(*b*) *Structure.*	Let the children break their slate-pencils and carefully notice the serrated appearance of the fracture. With a pocket-knife the teacher can split some laminæ from the roofing slate. The inference then will be that slate is composed of a number of layers. This laminated structure of certain rocks might further be shown in the specimen of mica and contrasted with the structure of a piece of chalk. It is a very useful property of slate, enabling it to be split into thin sheets, as shown by the school slates, the roofing slates, etc., and is called the quality of *cleavage*.
(*c*) *Hardness.*	The children will notice the ease with which slate may be scratched. Some slates can be scratched with the finger-nail. The specimens of mica, slate, and quartz may be employed to show that the quartz will mark both slate and mica, while slate will scratch mica but not quartz. It is in this way that we determine the relative hardness of rocks.
II. How and where slate is found in the earth.	An advanced class might be told that slate was originally deposited as clayey mud, which afterwards hardened into shale. It was thus laid down as a sedimentary rock. If the teacher has no specimen of clay-shale at hand, the children could make a note to look for it on the next visit to the geological section of the local museum. Clay-shale splits into layers parallel to its bedding plane, while slate divides into layers at a considerable angle to its plane of deposition, very often even at right angles to it. A casual observer might thence infer that the vast beds of slate had been tilted from their original position. Professor Tyndall was able to show by experiments that this was not the case. Owing to movements of the earth's crust, the clay-shale was subjected to great *lateral* pressure at some distant period. This great pressure, of course, was accompanied by heat. The combined effect was to rearrange the tiny particles in the shale so as to become flattened out perpendicular to this new pressure. The rock was partially changed in its characteristics, or metamorphosed, and hence is classed as a metamorphic rock. Where these rocks have come to the surface owing to volcanic agency or folding of the earth's crust, they generally appear as peaked and serrated mountains which have a picturesque effect. We are thus enabled to obtain the slate by quarrying. From the picture of the slate quarry in the diagram a good idea may be obtained of the natural scenery of a slate district, and of the manner in which the slate is found in the bed. Notice should be taken of the great range of highlands running, with several interruptions, through Cornwall, Wales, Lancashire, Westmoreland, Cumberland, and thence into Scotland. These hills belong to the old Cambrian and Silurian system of rocks, and it is here that true slate formations occur. Similar kinds of geological strata may be noticed in the south and south-west of Ireland. From the mountains in North Wales, especially the districts around Llanberis, Bangor, Penrhyn, and Festiniog, more slate is produced than from any other place in the world.
III. How the slate is obtained from the quarry.	The diagram gives us some idea of the method of quarrying slate. Very large blocks are removed by blasting, and these huge pieces are then split down their lines of cleavage into plates of a convenient size for removal. From this description the children will see that slate-quarrying is not attended with the dangers of coal-mining, and is a far healthier occupation.
IV. Some of the chief uses of slates. (*a*) *Covering roofs.*	The sight of the roofing slate will at once suggest one of the chief uses of slate—namely, to cover roofs. For this purpose slate is one of the best and cheapest materials we know. It is practically impervious to rain, and, at the same time, not very heavy. The diagram shows the preparation of a roofing slate. We see the operation of splitting one of the thick pieces from the quarry into thin sheets by means of chisels and a mallet. The edges of the slate are next trimmed with a dressing-knife. Slates are made of various sizes, from 15 inches by 8 to 36 inches by 24. Generally speaking, one size only is used for a particular roof, so as to make the slater's task easier, and give a neater appearance to the work. A slater commences his work at the eaves of a roof and finishes at the ridge. Call attention to the arrangement or *courses* of the slates. *Breaking joint* as they do, and overlapping, they effectually prevent any rain soaking through the cracks and penetrating to the boards or battens beneath. Two nail-holes are punched near the end of each slate, and copper nails, or those made of galvanised iron, are used to fasten

Heads.	Method of Teaching.
	them to the woodwork below. Elicit the reason of employing copper or galvanised iron nails—namely, the avoidance of rusting.
(b) *Slates for school, and slate-pencils.*	The use of slates in schools will also be suggested, and the convenience of framing them with wood.
(c) *Cisterns, etc.*	By questioning, we may ascertain that cisterns in houses are sometimes made of thick plates of slate.
	Such plates of slate are usually of a harder texture than roofing slate, and do not split so readily. They are therefore sawn. Similar slabs are used for billiard-tables, and being ground perfectly smooth, form a firm and true surface. Slabs of slate are sometimes enamelled and decorated in imitation of marbles, and used for chimney-pieces and other architectural decorations.

BOTANICAL NOTES FOR TEACHERS.

BY PROFESSOR J. R. GREEN, SC.D., F.R.S.,

Late Examiner in Botany to the University of London, and to the University of Cambridge;

AND F. L. GREEN,

Late Science Mistress in the Clifton High School.

Schedule A. 2 (*a*). *Budding Twigs.*
(Setchell's *Laboratory Practice*, chap. viii.; Farmer's *Botany*, chap. iii.)

Examine in detail a branch of horse chestnut. Notice first the terminal bud, observing the protecting sticky bud-scales, cataphyllary leaves or *tegmenta*. They are imbricated—that is, they are placed at different levels, and the outer successively overlap the inner to a greater or less extent by their margins. Pick off the bud-scales. The foliage leaves lie within them, and there is often a young flower-shoot within the foliage leaves. It is best to soak the buds in spirit for a few days, so as to easily get out the flower-shoot. Notice the arrangement of the foliage leaves. It is *decussate*—that is, the pairs as they succeed each other cross at right angles. The petioles of the lower leaves are elongated, so as to bring the blade clear of the younger ones, and they thus escape being overshadowed by each other. Notice the ring-like markings recurring at intervals on the stem. These are due to the falling off of the bud-scales, and the interval between two such aggregations of rings marks the amount of one year's growth. Compare with the horse chestnut, branches of oak and poplar. There is a good section on the oak in Farmer, p. 245. The tegmenta of the poplar are resinous. Branches with buds may now be tied up into bundles and dried. When wanted for use, they can be placed in boiling water, and allowed to remain there till the water is cool. Then all the parts will swell to their normal size, and will be ready for examination. The transition from scales to leaves is seen well in the red currant, and it is a good plan to paste a series upon cards for use in the class.

Schedule A. 7. *Bark of Trees.*

Take sections of branches of elm, oak, and walnut. Distinguish the bark. Notice its layers—(*a*) the *cambium* or generating tissue just outside the wood; (*b*) the *phloëm* or bast, a fibrous inner layer; (*c*) a fairly wide yellowish-green ring, the *cortex*; (*d*) a narrow brown ring, the corky bark. Notice the bast of the lime. It is used by gardeners for tying up plants. The maple and the elder afford good examples of cork. Bark is a protection to the internal tissues.

Schedule B. 1. *Lesser Celandine or King-cup* (*Ranunculus Ficaria*).

"The star-shaped yellow celandine." The swallow-flower, flowering about the time when the swallow first appears. 1. Regarded as a member of a family, it is the figwort ranunculus, and belongs to Ranunculaceæ. Compare with the buttercup, the usual type of the order, and with marsh marigold, anemone, hellebore, larkspur, columbine, monkshood, globe flower, clematis. (Compare Snelgrove's *Object Lessons in Botany*, Lessons ix. and x. John's *Flowers of the Fields* is good.) Characteristics of the family:—Herbs; stems mostly with an acid juice; a poisonous order; stamens indefinite, pistil apocarpous. 2. As an individual. Floral formula K 3, C 7–9, A ∞ G ∞. Compared with the type plant buttercup—(1) it grows in the shade instead of sun; (2) it flowers earlier; (3) its roots are tuberous instead of fibrous or bulbous; (4) its leaves are reniform or cordate, glabrous and entire, instead of much divided and hairy; (5) the calyx has three instead of five sepals; (6) the corolla has seven to nine petals instead of five to seven, they are linear and pointed instead of being obovate and hollowed; (7) the corolla is star-shaped instead of cup-shaped. Habitat—banks of hedges, meadows. 3. Distinguish from the greater celandine, a member of the Poppy family. It has an apocarpous instead of a syncarpous ovary. Fruit achenes instead of a capsule.

Schedule B. 2. *Arabis* (*Rock Cress*), *Shepherd's Purse* (*Capsella*).

Arabis is a cultivated rock plant with white flowers. Shepherd's purse grows by every roadside, and derives its name from the shape of its fruits, which are like little inverted purses. 1. Considered as members of a family, they are crossworts, and belong to Cruciferæ, a non-poisonous, useful order. Characteristics—flowers cruciform, stamens tetradynamous. Evans's *Botany for Beginners* gives a useful summary of the order (compare Johns). Snelgrove takes for type lady's smock. Crucifers cultivated for food are turnip, radish (roots), cabbage (leaves), cress (seedlings), white mustard, cauliflower and broccoli (inflorescences), black mustard (seeds), rape and colza (oil). Garden flowers are wallflower and stock. 2. As individuals, floral formula K 2 + 2, C 4, A 2 + 4, G (2). Shepherd's purse affords an example of a shoot exhibiting different characters on the same individual (radical and cauline leaves). The radical leaves occur in a rosette, and vary. In some plants the leaves are entire, and obovate and spatulate; in others the leaves are more lanceolate, and perhaps deeply pinnatifid. The cauline leaves are sometimes sessile. Shepherd's purse is an example of a variable species—that is, different individual plants differ in the form of parts which otherwise correspond to each other. Notice the fruit. It is a superior, spuriously two-celled, and many-seeded fruit. It dehisces by two valves separating from below upwards, and leaves the seeds attached to two parietal placentas which are connected together by a spurious vertical dissepiment called a *replum*. It is broad and short, and is called a *silicula*. Compare with the fruit of the wallflower, which is long and narrow—a *siliqua*. The shepherd's purse is a good plant in which to observe the development of the embryo. Soak ovules in different stages of development in potash solution till they are almost transparent. Mount in glycerine on a slide, and burst the ovules by tapping the cover. The low power will show the older stages, the high power the younger stages. Distinguish (1) the suspensor; (2) the embryonic cell; (3) the layers of the embryo, dermatogen, periblem, plerome; (4) the cotyledons. (See Evans's *Botany for Beginners*, page 217.)

Schedule B. 3. *Chickweed* (*Stellaria media*).

1. As a member of a family. It is a stitchwort, and belongs to Caryophyllaceæ. Characteristics—stems swollen at the nodes; leaves opposite and entire; stamens, ten; free in two series. Evans's *Botany for Beginners* takes it as a type plant. Poisonous plants belonging to the order are corn cockle and common soapwort. The pink, carnation, picotee, bladder campion, lychnis, and ragged robin all belong to this order. 2. As an individual. Floral formula K 5, C 5, A 5 + 5 G 3. Habitat—it grows everywhere. Notice the inflorescence, which is definite, forming dichotomous cymes. The flowers are symmetrical or actinomorphic. The one-celled ovary affords a good instance of axile placentation. The carpels meet in the centre of the syncarpous ovary, and the ovules are attached to the axis. The mass or structure out of which the stalks of the ovules grow is a placenta; and as the placentas divide the cells and radiate from the axis, the placentation is said to be *axile*. The fruit is a capsule, opening by valves. The pollination of this plant is interesting: there are five nectaries, small knobs outside the stamens, in which honey is produced. The flowers are cross-pollinated by insects. Some flowers never open, and are self-pollinated; but they are not cleistogamic. The chickweed is a variable plant: the sepals may be six; stamens may be five, or wanting.

Schedule B. 4. *Hawthorn* (*Crataegus*).

1. Regarded as a member of a family, it belongs to the natural order Rosaceæ, a large order containing many useful plants.

Fruits belonging to this order are apple and pear, almond, peach, and nectarine, cherry, apricot, and plum, strawberry, raspberry, and blackberry. Characteristics of the order:—Herbs with actinomorphic perigynous flowers; stamens indefinite.

2. Regarded as an individual. Compare with the rose, the type of the order. (See Evans's *Botany for Beginners*, 258, and Snelgrove's *Object Lessons in Botany*, Lesson xviii.) Floral formula K (5), C 5, A ∞, G 2. The perigynous stamens distinguish it from a ranunculus plant. Compare the fruit with that of the apple, a pome. It differs from it in consisting of only two carpels and in being two-celled. The portion of the receptacle surrounding the carpels becomes hard and forms a stony endocarp. The fruit is inferior and apocarpous. Notice, too, the spines of the hawthorn, which are arrested branches.

SCHEDULE B. 5. *Gorse* (*Ulex*).

1. Regarded as a member of a family. It belongs to the natural order Leguminosæ, a large order, readily identified by its papilionaceous flowers. Leguminous plants cultivated for food or fodder are peas, beans, clover, scarlet runner, medic, sainfoin, vetches, rest-harrow, trefoil, melilot, furze. Garden plants are lupins, sweet peas, everlasting peas.

2. Regarded as an individual. Compare with the type, sweet pea (Lessons xix., xx., Snelgrove's *Object Lessons*). Floral formula K (5), C 5, A (10), G1. The flower is zygomorphic or irregular, for it can only be divided into equal parts in one place. Examine the flower in detail: it is papilionaceous, shaped like a butterfly; the large petal, the standard, is posterior, nearest to the axis of the inflorescence; two petals slightly adhere, forming the keel, and are anterior nearest to the bracts; two petals, one on each side of the standard, are also wings, and are lateral—that is, at the sides. Notice the fruit. It is a legume—that is, it is a superior one-celled fruit, dehiscing by both ventral and dorsal sutures so as to form two valves, and bearing its seeds on the ventral suture.

SCHEDULE B. 6. *Hogweed* (*Heracleum*).

There is a good lesson in Snelgrove's *Object Lessons*, Section III., Lesson xv. The cow parsnip may be regarded (1) as a member of a family. It belongs to the natural order Umbelliferæ, the Parsley family—herbs with alternate leaves and flowers arranged in umbels. It contains many poisonous plants—for example, hemlock, fool's parsley, and water dropwort. Useful plants belonging to the order are carrot, parsnip, celery, fennel, parsley, caraway, and coriander. (2) Regarded as an individual. It is a good type plant. Floral formula, K (5), C 5, A 5, G (2). It is a coarse, heavy plant, with small white regular flowers in compound umbels, and is gathered by boys as food for rabbits. There is no visible calyx except the covering of the ovary. Notice the fruit, a schizocarp or cremocarp which splits into two mericarps. It is winged on the edges, and splits when ripe into two parts; each half remains attached for a while by a fine thread to a slender central axis, and there is one large seed in each mericarp. Cut a section through an unripe fruit, and notice the *rittas* or oil glands. The flowers are pollinated by flies, beetles, and wasps.

SCHEDULE B. 7. *Daisy* (*Bellis*), *Dandelion* (*Taraxacum*).

1. Regarded as members of a family. Both plants belong to the great natural order Compositæ; herbs with five syngenesious stamens and a one-celled ovary; flowers arranged in heads. Useful plants are the sunflower, Jerusalem artichoke, garden chrysanthemum, chicory, and lettuce. In garden flowers, we have the cineraria, helichrysum, gaillardia, calliopsis, daisy, dahlia, and senecio. 2. Regarded as individuals. The daisy is a type plant for sub-order Tubulifloræ, the dandelion for sub-order Ligulifloræ. (Compare Evans's *Botany for Beginners*, chap. xx., with Snelgrove's *Object Lessons*, Section II., Lessons xxvi., xxvii., xxix., xxx.) Notice cross-pollination and self-pollination in the daisy and dandelion, and the attractive ray flowers of the daisy. The bright colour attracts in the dandelion. The inflorescence is a capitulum or head, formed by a number of sessile flowers or florets crowded together on a receptacle, and the whole surrounded by an involucre.

SCHEDULE B. 10. *Red Dead-nettle* (*Lamium*).

1. Regarded as a member of a family. It belongs to the natural order Labiatæ—plants with square stems and opposite leaves; flowers zygomorphic; stamens fewer in number than the lobes of the corolla; ovary four-lobed; style gynobasic. Floral formula, K 5, [C (5), A 4], G (2). A useful order, including mint, pennyroyal, thyme, sage, marjoram, and balm. 2. Regarded as an individual. It is a good type plant. Notice the whorled phyllotaxis (Farmer's *Botany*, p. 8), the inflorescence (Farmer, p. 53), the distribution of vascular bundles in the stem (Farmer, p. 83). There is a good section on the flower (Farmer, p. 237). Snelgrove's *Object Lessons in Botany*, Section II., Lesson xxiii., has a lesson on the dead-nettle. Compare the type with other plants of the order. The flowers are cross-pollinated by humble-bees.

Catkins of Hornbeam, Willow, Birch.—Consult Farmer's *Botany*, chap. xxxiii. The birch is *Betula alba*. Points to be noticed are the bark, leaves, and inflorescences. The hornbeam is *Carpinus betulus*. Study the distribution of the male and female catkins. The yellow palms of the willow are upright catkins of staminate flowers; the silver palms are catkins of pistillate flowers. They are dioecious, growing on separate trees, never on the same. The natural order Cupuliferæ is economically important, containing the oak, beech, hazel, chestnut, and other useful trees.

PRACTICAL ELEMENTARY SCIENCE.

AN EXPERIMENTAL COURSE COVERING THE REQUIREMENTS OF BOTH THE DAY AND EVENING SCHOOL CODES IN PHYSICS AND CHEMISTRY.*

BY THOMAS CARTWRIGHT, B.A., B.SC.,

Author of "Practical Chemistry," "'Section One' Physiography," etc.

The Barometer.—The first step will be the performance of some simple experiments proving that air exerts pressure. To show that air presses downwards will be very easy indeed. If each boy is provided with a piece of glass tubing of small bore, and if he puts it in a vessel of water and draws up with his mouth, and then places his finger upon the end of the tube out of water, the tube can be drawn from the water, holding a column of water within it. This should be done, and at a given signal the thumb should be withdrawn from the upper end of the tube, so as to permit the air to enter from above. The column of water will, of course, now flow out of the tube. It will be easy to get the pupils to explain (1) why the water falls out when the thumb is withdrawn from the top of the tube, and (2) why it remains in whilst the top of the tube is covered by the thumb. (See *Practical Chemistry*, p. 18.) This is the principle of the pipette. It is not so easy to get the pupils to understand that air may press upwards by pressing downwards upon the surface of a liquid, which must of necessity transmit the pressure upwards, because liquids transmit pressure equally in *all* directions. This point must be thoroughly driven home if there is to be any reality about the lesson. It will therefore be advisable to repeat the experiment with the perforated ball, which is filled with water by placing it under the surface of water contained in a vessel, and then removed from the water and squeezed in such manner as to make the water squirt out. The thing to notice is that the water squirts upwards, downwards, and sideways, and indeed in all directions, with equal force; hence the pressure exerted by the thumb and finger must have been transmitted equally in all directions by the water. This important property should be well insisted upon, after which the students should be provided with test-tubes and some vessel—a saucer will answer admirably—containing water, in which the test-tube may be inverted after it has been filled with water. Why does the column of water remain in the test-tube and not flow out? It must be got from the pupils that the water in the saucer cannot possibly be holding the column of water up, because it is not nearly so tall as the column above the surface of the water in the saucer. A little questioning will suffice to lead the minds of the pupils to a consideration of the pressure of the air upon the surface of the water. Then should come a reference to the perforated ball experiment, with its lesson, which, when judiciously applied to the experiment under consideration, should enable the students to see for themselves that the column of water in the test-tube is kept up by the pressure of the air, which is transmitted in all directions, and therefore upwards (which is the only direction of interest here), by the water, in accordance with the law of liquid pressure.

* Books referred to in this series of articles are published by T. Nelson and Sons.

What Height of Water the Air can hold up.—Tubes about a yard long should be made from pieces of glass tubing of about ⅝-inch bore, one end of each being closed by fusing in the Bunsen burner. These should be filled with water, and the experiment above described should again be performed, with the substitution of the long tubes for the test-tubes. Again it is noticed that the air is able to keep up the whole of the water, so that a column of water a yard high does not exhaust the balancing power of the atmosphere. Shall we try longer tubes? (See Castle's *Physics*, p. 72.) It will be very inconvenient, and is not at all necessary. The pupils should be invited to suggest how; and a reference to the work that has been done with balancing columns—where a short column of a heavy liquid counterbalanced a long column of a lighter liquid—should point the way to the desired modification, which consists in changing the liquid instead of the tube. What liquid should be used? Mercury will be sure to suggest itself to some student, and he should be rewarded by being permitted to perform the experiment, which will be the same as before, except for the substitution of mercury for water. Why does the column of mercury not remain in the tube? and why, on the other hand, does it not fall lower than it does? The master should at this stage question his pupils skilfully, so as to lead them to imagine two unequal balancing columns—the one of mercury, 29 inches high; the other of air, of a height extending to the upward limit of the atmosphere, say 500 miles. The arrangement is thus **a U-tube balance** exactly similar to those already used, except for the fact that one of the columns, being a gas, has no need of a limb of glass to contain it.

Other Liquids.—If the height of a column of mercury able to balance a column of air is 29 inches, what must be the height of a column of water able to balance the atmospheric column? If there is any difficulty in getting a response to this question, the balancing of water against mercury in a U tube should be promptly performed, to the end that the pupil may clearly understand that the heights of the columns of different liquids that balance each other are inversely as their densities; and therefore, mercury having a density of 13·6, the column of water capable of balancing a column of air must be 13·6 × 29 inches = about 33 feet in height. The student will now see why we preferred to change the liquid rather than to change the tube in striving to arrive at this conclusion, since it would be ridiculous to use a tube 33 feet high.

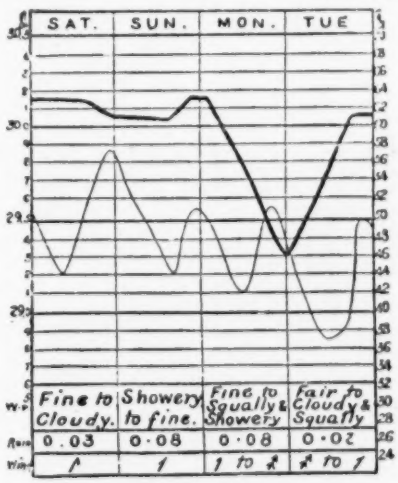
The class should next be questioned as to what would be the height of columns thus balanced against the air of glycerine, milk, alcohol, etc., the density of the liquid being got by the pupil from his laboratory book.

The Use of the Barometer.—The first step here is to show that water-vapour is lighter than air. The student may be set to prove this for himself. All that is requisite in the way of apparatus is a flask, some glass and rubber tubing, and a spring or screw clip. Flask, clip, cork, and tubing are weighed after the apparatus has been fitted up. Some water is introduced, and is boiled away until there is none left except the steam that fills the tube. The clip is now made to pinch the rubber tubing so that air cannot enter, as it would otherwise do when the steam condensed to water upon cooling. The whole apparatus should now again be weighed; and if the experiment has been carefully performed, the weight will be less than that of the flask, etc., when it contained air. Or the student may be asked to explain how clouds are formed. He may now be asked to say whether the weight of a column of air varies according to its condition with respect to moisture—the aim being to bring home clearly to his mind that moisture-laden air is lighter than dry air; hence there will be a variation in the height of the column of mercury, etc., corresponding to the change in the air with respect to moisture, and therefore to the changes in the weather, which depend so largely upon the amount of moisture contained in the air.

This will lead naturally to a consideration of the constitution and working of the barometer. To make a barometer, the student needs but a short, straight piece of glass tubing and a stout piece of rubber tubing, with which he can join together the tube used in the preceding experiments and the short, straight tube just spoken of. Before joining, the long tube is inverted and filled with mercury, and the short tube is joined to it by the rubber tubing whilst still inverted. Upon placing the barometer thus extemporised in its proper position—namely, with the open end of the short limb upwards—the mercury will fall until it is about 29 inches above the level of the mercury in the short limb. After what has been already said, there should be no difficulty in getting the pupil to see that the mercury in the open limb of the U tube is exactly balanced by the amount of the mercury in the closed limb, that is equal to it in height; the remainder of the column, which will be found to be about 29 inches in height, counterbalancing the column of air, the pressure of which it measures. This will be understood without further explanation from the diagram in "*Section One*" *Physiography*, p. 22, Fig. 8*b*, in which, however, the short limb is closed and the long limb open, instead of *vice versâ*, as in the case of the simple barometer that we are describing.

Barometric Observation.—If it is decided to take a daily reading of the barometer—and nothing can be more appropriate—the simple improvised instrument will answer very fairly, if it is fixed to a board about forty inches long provided with a scale giving heights above a certain line, with which the surface of the mercury in the shorter limb must always be level before the reading is taken. To make this possible, the tube must be so loosely attached to the board as to allow a small amount of up-and-down motion. The scale should commence at 28 inches above the fixed line, and should mark tenths of an inch between 28 and 32 inches. The students should be required to explain the rationale of these several arrangements.

How to record the Readings.—The readings should be recorded graphically on squared paper, each square standing for a tenth of an inch; and a curve of pressures should be obtained by joining the points corresponding to the recorded pressures for the various days. The same diagram may



WEATHER CHART.

conveniently and usefully be employed for a daily record of temperatures, and a curve of temperatures may thus be obtained side by side with the curve of pressures, with which it may be compared, so that the interdependence of pressure and temperature is visibly demonstrated. The diagram will make plain what is meant, although it is not made on squared paper.

The Word "Barometer."—It will not be amiss to give the derivation of the word "barometer" (*baros*, weight; *metron*, measure), and to get the pupils to show its propriety in so far as the barometer is a kind of balance for ascertaining and recording the pressure of the atmosphere.

Forms of Barometer.—If either a Fortin or a siphon barometer is available, readings from this should be taken, and a record of them should be placed side by side with those taken from the extemporised instrument. The prin-

ciple of each of these instruments should be explained at the same time as the instrument is shown; but as the explanation can be got from any text-book—as, for instance, Castle's *Practical Physics*, pp. 73, 74—we need say no more here than that the explanation should be carefully dovetailed into what has gone before, in leading up to the construction of a barometer.

Of course, very many more experiments—such, for example, as those concerned in the demonstration of Boyle's Law (see Castle's *Practical Physics*, Figs. 71 and 72)—might have been included in this article, but space will not permit this, and, after all, the real object will have been attained if the pupil understands (1) that air exerts pressure; (2) that liquids transmit this pressure in all directions (including upwards); and (3) that in a barometer the column of mercury is balanced by a column of air, so that (4) the height of the column of mercury varies with the varying density of the air, which (5) is mainly due to the condition of the air with respect to moisture: all of which may be summed up in the old saw—namely, that (6) a falling barometer indicates rain, which the pupils may very fairly be called upon to explain by way of conclusion to their course of lessons on the barometer.

BLACKBOARD DRAWING.

THE FREEHAND COPY.

BY EDITH F. BAMFORD, ART TEACHER, EDGE HILL TRAINING COLLEGE.

III.

"STUDENTS should be able to copy upon a large scale a diagram such as that used for freehand drawing in the higher standards of the Elementary School Drawing Syllabus, which will be placed before them."

These are the instructions in the Science and Art Directory, given to the candidate for examination in blackboard drawing, for the sketching of the freehand copy. As stated in a previous article, the object of this exercise is not merely to test the candidate's power to make a correct enlargement, but to test his skill to produce the lines with rapidity and freedom, and his ability to show to a class the correct method of sketching the copy. Absolute accuracy of reproduction is not so essential as rapidity, freedom, and correct method.

It is supposed in this paper that the candidate has already received training in elementary freehand drawing, that he knows the primary principles of design, and has studied the growth and form of the acanthus leaves, as these leaves, or similar ones, are used extensively in freehand copies. The candidate should first practise from easy copies with long, flowing lines and little detail, and should gradually proceed to others of greater difficulty and more elaborate detail. Some of the copies used should be the size of an ordinary second grade freehand copy, and they should be held in the hand whilst they are sketched; others should be larger, and should be suspended three or four yards from the candidate. Either of these methods may be employed at the examination. The general rules for blackboard drawing given in the second article should be rigorously observed.

A diagram is given here (Fig. 1) which may be considered as difficult as any required for this elementary course in blackboard drawing, and by means of it the general plan of work and the leading principles to be observed will be shown, as they are the same in all copies.

The sketching may be divided into four stages.

1. *General Proportion.*—Compare the full height and width of the copy, and mark off with four short strokes the proportion on the blackboard in such a position that the sketch will be well placed; then draw the central line. The greatest width should be about one yard. Great care should be taken to have the general proportion correct, so that there will be no serious mistake when the enlargement is completed; but the eye alone must be depended upon for measuring. No balancing lines are necessary in working this copy, and in sketching any copy, as few balancing lines as possible should be used: they are of no value in the design, and they hinder the training of the eye to measure directly.

2. *Leading Lines.*—Each of these should be sketched with one stroke if possible, corrections being made afterwards. The *radiation* and *continuity* of these leading lines should be recorded, also the *tangential joining* of *a* to *b* (Fig. 2).

3. *The Blocking.*—The large blocks should next be drawn (Fig. 3, right-hand side), and the continuity of line *a* and the form of block *b* should be carefully observed and sketched. The lines for the blocks should be as accurately and clearly sketched as those for the detailed work.

4. *The Details.*—These should now be sketched, the leaf notches being first indicated (Fig. 3, left-hand side). It should be clearly shown that the small lobes are partly formed from the outline of the large blocks, and the veins of the leaves, and their tangential junction with the leading curve, should be indicated (Fig. 4, right-hand side).

It is a good plan to retain all construction lines on one half of the drawing if it is symmetrical, or one part if unsymmetrical, in order to show the method; but the other half or part should be completely finished, and the construction lines rubbed out. If lining-in is necessary, rub over the drawing lightly with a duster, so that only a faint impression remains; then strengthen the construction lines where required, and the correct lines of the diagram. Use the edge of the chalk for the veining of the leaves, beginning where the vein thins off, and the line will be thickened as the edge of the chalk wears away.

The exercises on circles, spirals, and symmetrical curves, advocated in the second paper, will be found very helpful training in this branch of blackboard drawing.

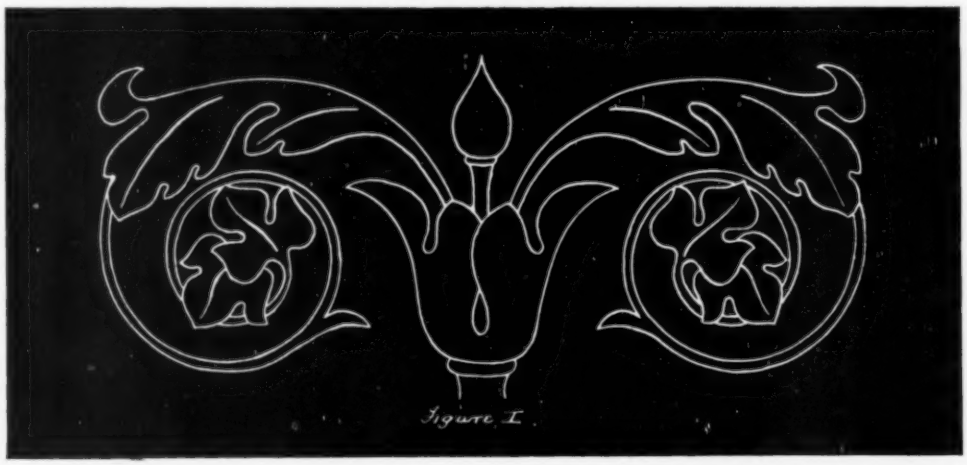
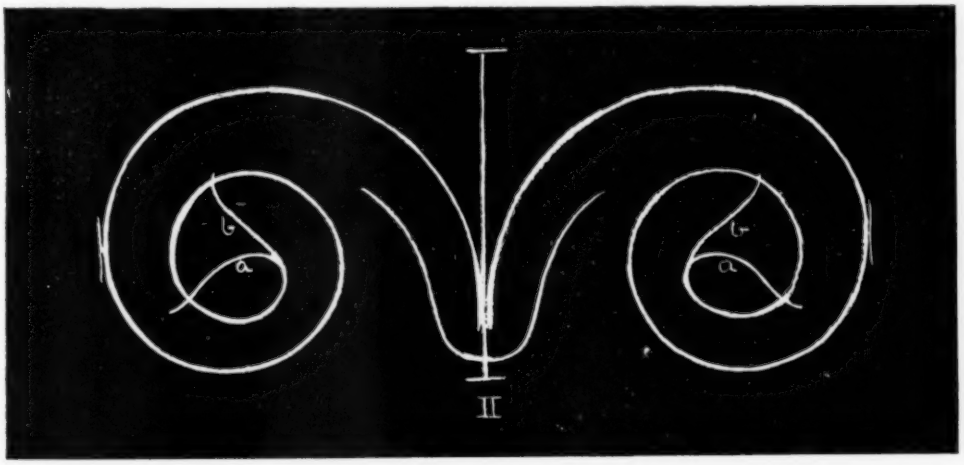
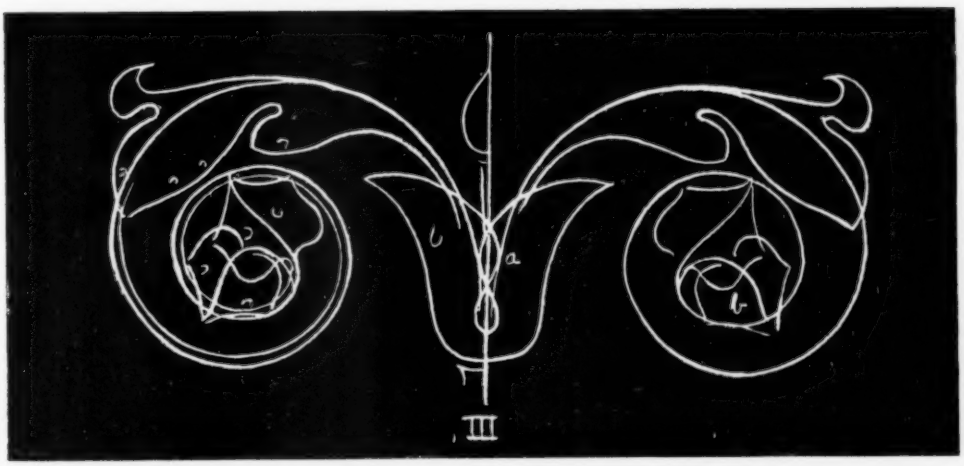


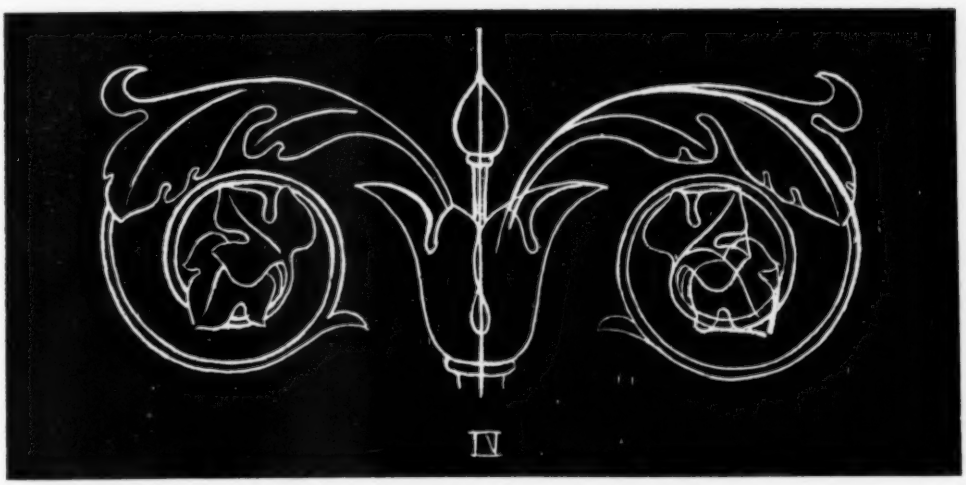
Figure I.



II



III



IV

ELEMENTARY LESSONS IN THE PRINCIPLES OF GRAMMAR.

A Course of Forty Oral Lessons for the First Year (New Code, Standard IV.).

BY JOHN R. TIMSON, B.A.

LESSON XXVIII.

AUXILIARY VERBS.

THE present and past tenses of a verb may consist of one word, but all the other tenses of verbs are shown by auxiliary or helping verbs, which are the same for every verb. Thus every verb forms its future by "shall" and "will."

I shall go.

"Go" is the *principal* verb and "shall" is the *auxiliary* verb of the future tense. The principal verb always comes last; for example,—

Has Tom been writing?

"Writing" is the principal verb, "has been" the auxiliary verb.

He has been good.

"Been" is the principal verb, "has" is the auxiliary verb.

We must now thoroughly master the principal tenses and their auxiliary verbs.

Past time is in most cases shown by adding "ed" or "d" to the form of the present. This is taken as a *rule*, and verbs following the rule are called *regular*. Latin *regula* is a rule.

Other verbs are *ir*regular, not according to the rule.

I walk, I walk*ed*.....Regular.
I speak, I *spoke*.....Irregular.

"Speak" is conjugated *according to a rule*, therefore regular.

Boys who keep the rule of coming to school whenever it is open are regular; those who do not are *ir*regular.

To mark simple futurity in an assertion we use "shall" in the first person,—

I shall go. We shall go.

"Wilt" or "will" in the other persons,—

Thou wilt go. He will go.
You will go. They will go.

We reverse these to indicate the "will" of the speaker and the absence of the "will" of the second or third person.

"I will go" means "I, the speaker, *will* myself to go."
"Thou shalt go" means "I *will* thee to go."
"He shall go" means "I *will* him to go."

In this case "shall" and "will" are transitive verbs, with "to go" as the object of compulsion or will of the speaker. We shall reconsider this in another lesson.

We must be very careful to keep "shall" for the first person, and "will" for the other persons, to denote future tense.

We have already noticed that the verb "to have" is used to denote completion or perfection of action.

Have .....Auxiliary verb of the present perfect tense.
Had.....Auxiliary verb of the past perfect tense.
Shall have...Future perfect tense.

The verb "to be," with the present participle in "ing," is used to denote imperfect or progressive action.

I am writing.....Present imperfect tense.
I was writing.....Past imperfect tense.
I shall be writing.....Future imperfect tense.
I have been writing.....Perfect progressive tense.
I had been writing.....Past perfect progressive tense.
I shall have been writing...Future perfect progressive tense.

We use the word "progressive" because "imperfect" sounds contradictory to "perfect"—an opposition called a paradox. But really there is no opposition of meaning.

Let us examine "I shall have been writing."

Shall.....Auxiliary verb of the future tense.
Have.....Auxiliary verb of the perfect tense.
Shall have been.....Future perfect tense of the verb "to be," used as an auxiliary verb of the imperfect or progressive tense.
Shall have been writing...Future perfect progressive tense.

At some point of time in the future the action will be complete or perfect, but up to that point it was proceeding, progressive or imperfect. I assert my writing to be continued and also completed in the future.

The verb "to do" is used as an auxiliary verb for three purposes:—

1. To ask questions,—*Do* you go? *Did* he come?
   Do.....Auxiliary verb of interrogation.
2. With negative sentences,—I *do* not see it.
   Do.....Auxiliary verb of negation.
   Not....Adverb of negation, qualifying "do see."
3. For emphasis,—I *do* say it.
   Do.....Auxiliary verb of emphasis.

MEMORY NOTES.

The verb "to have" shows perfect tense.
The verb "to be" shows imperfect or progressive tense.
The verb "to do" shows interrogation, negation, or emphasis.
"Shall" and "will" show future tense.

Only the present and past tenses of verbs are formed without the use of auxiliary verbs. If the past tense ends in "ed" or "d," the verb is regular; if not, the verb is irregular.

List of Auxiliary Verbs.

Shall, will .....Future tense.
Have, had, shall have.....Perfect tenses.
Am, was, shall be.....Imperfect tenses.
Have been, had been, shall have been... .....Perfect progressive tenses.
Do, did .....(1) Interrogation. (2) Negation. (3) Emphasis.

LESSON XXIX.

CONJUGATION.

The conjugation of a verb is the arrangement in order of all its various forms. The verb is the most important word in a sentence, and its tenses must be thoroughly understood and committed to memory.

We must carefully distinguish between time and completion of action.

1. Time is present, past, or future.

2. An action may be regarded as continuing or as complete, whether in the present, past, or future.

3. An action may be regarded as continuing up to a certain time, and then being perfect or complete.

We will put it in another way.

The *state* of the action is very different from the *time* of the action.

The state of an action may be considered in three ways:—

1. As proceeding or going on. This state we call progressive or imperfect.

2. As complete or perfect.

3. As proceeding to a time and then being complete. This state we call perfect progressive.

Hence we have:—

1. Three simple tenses in which the state of the action is disregarded,—

Present.....I write.
Past.....I wrote.
Future.....I shall write.

2. Three perfect tenses in which the state of the action is complete in the present, the past, or the future,—

Present perfect.....I have written.
Past perfect.....I had written.
Future perfect.....I shall have written.

3. Three imperfect tenses in which the state of the action is progressive in the present, the past, or the future,—

Present imperfect.....I am writing.
Past imperfect.....I was writing.
Future imperfect.....I shall be writing.

4. Three perfect progressive tenses in which the state of the action is regarded as progressive, and finally perfect, in the present, past, or future,—

Present perfect progressive.....I have been writing.
Past perfect progressive.....I had been writing.
Future perfect progressive.....I shall have been writing.

The conjugation of a verb is so important that we will arrange these twelve tenses in another way.

There are three principal tenses to indicate time—the present, the past, and the future. Each of these has four forms, to show *state* of action:—

1. Simple: the state of the action is not denoted.
2. Perfect: the state of the action is complete.

3. Imperfect: the state of the action is progressive.
4. Perfect progressive: the state of the action is progressive to a certain time and then complete.

Practice should be given to conjugating verbs in these twelve tenses.

MEMORY NOTES.

TABLE OF TENSES.

STATE OF ACTION.	TIME.		
	Present.	*Past.*	*Future.*
Simple.	I write.	I wrote.	I shall write.
Imperfect.	I am writing.	I was writing.	I shall be writing.
Perfect.	I have written.	I had written.	I shall have written.
Perfect progressive.	I have been writing.	I had been writing.	I shall have been writing.

These tenses should be repeated in full, and committed to memory in both the vertical and the horizontal order.

The twelve principal tenses may be remembered by saying present, past, future, followed by each of the words simple, imperfect, perfect, perfect progressive,—

Present / Past / Future ..... simple / imperfect / perfect / perfect progressive — tense.

OUR ILLUSTRATED GEOGRAPHICAL NOTEBOOK.

RAILWAY ENTERPRISE IN ASIA MINOR.

ASIATIC TURKEY has an area of about 730,000 square miles, which is just about equal to the joint extent of Great Britain, France, Germany, and Austria. The surface of the country is very diversified. The climate varies considerably: in the valleys it is warm, pleasant, and salubrious; the elevated portions are subject to severe cold in winter. There is scarcely any vegetable commodity of commercial value that cannot be raised with ease—wheat, barley, rice, tobacco, maize, hemp, cotton, and flax; such fruits as the olive, fig, orange, and vine ripen to perfection; and there are extensive deposits of useful minerals, at present practically unworked.

Here we have the natural conditions most essential to commercial prosperity. But these fair and fertile regions have long been cursed by the yoke of the "unspeakable Turk," whose blighting rule allows no scope for enterprise, and who is ever content to let matters commercial and political drift almost whither they will.

The total value of the exports from these vast regions does not exceed £12,000,000, and even this small sum includes the foreign trade of Turkey in Europe also. By way of comparison, we may note that the exports of so small a country as Denmark far exceed those of the vast dominions of the Sultan.

A reference to our map reveals at a glance an astonishing dearth of railways, in a country so near the centres of civilisation, at this end of the nineteenth century. Now, however, there is a reasonable prospect of these regions wakening up to life and prosperity.

When the Emperor of Germany paid a visit to the Sultan in 1898, he obtained a promise that a railway concession should be given to the Germans. A Turkish promise does not by any means guarantee its fulfilment; but in this case, after the disposal of many difficulties, the concession was granted.

At present, the only railways of any importance extend from Constantinople and Smyrna to Konieh, and from Smyrna to Kassaba and Dinair. The concession allows for the extension of the line from Konieh to Basra, on the Persian Gulf. We need not discuss the question who will supply the material for this vast enterprise, for it is a foregone conclusion that the whole of it will be supplied by Germany. This, however, is not the serious aspect of the matter. The concession will mean an enormous access of trade to Germany, to the detriment of British commerce. Under present conditions, the United Kingdom takes quite half the exports, and supplies about one-third of the imports. Under the new conditions, German goods will be carried direct by rail to Haidar Pasha, the Constantinople terminus of the railway, where the concession allows the construction of a port; without breaking bulk, the goods will be transferred by ferry across the Bosphorus to the German railway, and on to their destination. Germany watches jealously over the interests of her traders, and preferential rates for German goods along the new railway will force British goods out of markets which have hitherto been open to them.

The value of the new line to Germany will not end here. Baghdad is very close to the Persian frontier, to which a short line will be sure to follow in due course; and the trade of Persia is well worth seeking. Nor is this all. Steamers can convey German goods from Basra to Kurachee and Bombay, the bare possibility of which may well cause a flutter among all those interested in our trade with India.

It says little for our commercial astuteness that British capital at one time controlled the existing Asia Minor railways. We have undoubtedly allowed a formidable rival to gain a tactical advantage over us, but it may not be altogether irreparable. We are indebted to *Commercial Intelligence* for the suggestion that a line from Cairo to Basra, and thence on to India, might successfully counteract the German concession so far as our Indian interests are concerned. If something of the kind is not done, the British traders' prospects of success in India will make one more step towards the vanishing point.

FROM THE CAPE TO CAIRO.

Notwithstanding the numerous exploring expeditions of recent years in various portions of the African continent, the journey throughout its entire length from north to south has only recently been accomplished. Mr. Ewart S. Grogan is the hero of this remarkable achievement, and on 30th April he read a paper before the Royal Geographical Society describing his journey.

The section from Cape Town to Rhodesia presented but little difficulty, as the whole of this region is at least in a semi-civilised condition. The arduous portion of the route may therefore be said to have commenced at Beira, in Portuguese East Africa, to which town he went after leaving Buluwayo and Salisbury. From Beira the route taken was *viâ* Lakes Nyassa, Tanganyika, and Albert Edward Nyanza to Uganda. Here Mr. Grogan's only white companion left him, and he proceeded on his journey in the company of natives. Uganda he declares to be not nearly so bad as described by the average traveller.

Between the two Nyanzas the explorer and his companions encountered vast herds of elephants, and three weeks were spent in hunting them. The chief native tribe, the Balegga, had been suffering much from drought; and the advent of the white man, with his civilised weapons for overcoming big game on an extensive scale, was to them a source of unalloyed joy. They came down in droves for the meat.

"Stark-naked savages, with long greased plaits of hair hanging down to their shoulders, were perched on every available inch of the carcass, hacking away with knives and spears, yelling, cursing, and munching, covered with blood and entrails; old men, young men, prehistoric hags, babies, one and all gorged or gorging, smearing themselves with blood, laughing and fighting. Pools of blood, strips of hide, vast bones, blocks of meat, individuals who had dined not wisely but too well, lay around in bewildering confusion; and in two short hours all was finished. Nothing remained but the great gaunt ribs, like the skeleton of a ship's wreck, and a few disconsolate vultures perched thereon."

From Albert Nyanza he passed to Wadelai and Ludo, and thence on to Fashoda. Cannibal tribes frequently attacked the exploring party; but after overcoming many difficulties the swamp region of the Nile was entered, and here the difficulties of the expedition were enormously increased by the constant attacks of fanatical Soudanese and the continual ravages of malarial fever. Four hundred miles through this unknown swamp the indefatigable explorer forced his way. Before he had traversed this tract, he fell in with a party of British engaged in the work of freeing the course of the Nile from *sudd*. From that point the journey was less difficult, and the traveller arrived safely at Cairo. The journey occupied almost exactly two years. In the autumn Mr. Grogan proposes to publish a full account of his remarkable experiences, which will certainly be awaited with considerable interest.

THE INSPECTOR'S NOTEBOOK.

BY AN INSPECTOR OF SCHOOLS.

THE TIME-TABLE UNDER THE NEW CODE.

The Old System clean gone. It will take some time to realise the far-reaching effects of the radical changes of the 1900 Code. To lop away all the schedules of instruction at one swoop, and leave us, as it were, chartless, seems at first thought a trifle staggering. That it is the right thing to do goes without saying when we look back upon the near past and contemplate the rapid evolution of the present system from the day when the first blow was struck at the payment-by-results Code. If a new system is to be tried, the sooner we shed every bit of the old the better. It is simply a case of new wine needing new bottles.

* * * * * *

The Head Teacher the Mainspring of the New System. It seems to me the important thing for every head teacher to try to realise is how much more responsibility rests upon his or her shoulders. It will be no easy matter at first arranging courses of instruction for all the classes of a school.

The time-table and syllabuses will provide much information about the condition of the school. Let me therefore give a few general hints that will apply to most schools. The parcelling out of the time so as to make the most use of the available energy will become a science. Now the curriculum consists generally of the following subjects:—Reading, recitation, writing, composition, grammar, arithmetic, drawing, needlework, geography, history, object lessons on common things, singing, and physical exercises.

* * * * * *

Lessons which occur daily. Your school meets 5½ hours daily—that is, 27½ hours per week.

9 to 9.30. Prayers; religious instruction; inspection of hands, boots, etc.
9.30 to 9.40. Singing.
9.40 to 9.45. Registration.
9.45 to 10. Class subject.
10.35 to 10.50. Recreation.
1.30 to 1.40. Assembly; registration; inspection of hands and faces.
1.40 to 1.50. Mental arithmetic (twice), or recitation (once), or class subject (twice).
2.50 to 3. Recreation.

I simply enumerate above the items common to every day of the week. These occupy 1¾ hours daily, or 8¾ hours weekly. You now have 18¾ hours left. Needlework for girls and drawing for boys will proceed simultaneously, and should have at least 2½ hours weekly, best taken in two lessons of 75 minutes each.

This leaves you 16¼ hours. Of this time you will need at least 30 minutes for drill, 25 minutes for songs, and 80 minutes for experimental science (I., II., III.) and English grammar (IV.–VII.), taken in two lessons. You now have 14 hours left. Poetry will need 20 minutes, in addition to its being occasionally taken at 1.40 p.m.; and two long lessons in geography and history will need 40 minutes each. This leaves you 12 hours 20 minutes. Have one general information lesson of 20 minutes, when you can give instruction on politeness, punctuality, cleanliness, and events of the day. The remaining 12 hours may be devoted to arithmetic, reading, and writing—the writing to include composition and handwriting.

* * * * * *

The typical Time-table analysed. I feel confident, from the experience I have had, that a time-table drawn up as nearly as possible upon this basis will prove a successful one.

Let us arrange the whole thing in an analysis:—

	H.	M.
Religious instruction, prayers, etc.	2	30
Registration, inspection of hands, etc.	1	15
Recreation	2	5
Drawing and needlework	2	30
Physical exercises	0	30
Reading	4	0
Handwriting and composition	4	0
Arithmetic	4	20
Oral subjects, including grammar, object lessons, geography, history, and poetry	4	45
Singing	1	15
General information	0	20
	27	30

* * * * * *

The Analysis explained. I am convinced that a 30 minutes' lesson daily is sufficient for the religious knowledge. In many schools much more time is devoted, nominally, to this subject, but often this time is dawdled away; whereas in 20 minutes or 25 a smart teacher will cover as much ground as is necessary, and the lessons do not become tedious.

I give only half an hour for drill. Some teachers will like to amplify this, which, of course, may be done by cutting down some other subject: you may take half an hour from the time given to oral subjects. I have purposely grouped the time for oral subjects. In the upper standards I should be inclined to divide the time into three equal parts, giving

1 hour 35 minutes each to English (including poetry), Geography, and History ; but see my note below on this matter.

Singing, I think, should be taken the first thing daily. In no subject is it more necessary to have daily practice in order to produce satisfactory results. The old system of relegating it to the last lesson on Wednesdays and Fridays should never be sanctioned. Ear and voice training must be a frequent business. Touching the oral subjects, you will notice that I have arranged for one short lesson daily : so much can be done in a short lesson ; the children's attention is easily maintained, and the daily repetition develops the intelligence wonderfully.

Then once or twice a week you should give a longer lesson of a practical and experimental nature in science to the lower standards. Two longer lessons are also provided for in geography and grammar.

The general information lesson might be made longer by taking off some of the time given to oral subjects. Anyhow, I think this should be one of the most valuable lessons of the week. Habits of punctuality, cleanliness, and courtesy have to be cultivated. Interesting lessons on current events, and on common-sense things about which everybody should know something, can be taken at this time.

The four hours given to reading should include at least one hour's silent reading in the first class. The time for writing and composition should include at least one lesson of half an hour on penmanship. The time for arithmetic will include that for oral arithmetic as well as written.

* * * * * *

How to arrange the Class Subject Time. } Finally, let us analyse the 4 hours 45 minutes given to the oral subjects. We can only take an average school.

You get five lessons of 15 minutes each, three lessons of 10 minutes each, four lessons of 40 minutes each, and one of 20 minutes' duration.

Poetry, 50 minutes ; Object Lessons (I., II., III.), 2 hours ; Grammar (I., II., III.), 30 minutes ; do. (IV., V., VI., VII.), 1 hour 35 minutes ; Geography (I., II., III.), 85 minutes ; do. (IV., V., VI., VII.), 1 hour 40 minutes ; History (IV.–VII.), 40 minutes. Of the eight short lessons, give one to Recitation, three to Geography (IV., V., VI.) and Common Things (I., II., III.), two to Geography (I., II., III.) and History (IV.–VII.), and two to Grammar.

Answers to Correspondents.

D.M.N.—See page 300, December PRACTICAL TEACHER, and page 370, January number.

M.H.L.R.—He may please himself. He is entitled to charge if he choose.

J.M.W.—In view of the issue of the 1900 Code, it will be of little use giving you a history scheme. Get your managers to apply to the Board of Education for sample schemes of instruction.

K.—The Department will not force you to accept the Superannuation Act.

D.B.—Do not bother about getting your parchment until coming out of college.

X.Y.—Students *only* are obliged to recite fifty lines of French when offering French.

Letters should be addressed—Inspector, care of the Editor ; and should contain two stamps when an early reply is needed.

EDUCATIONAL HANDWORK.

WE would call the attention of teachers in Scotland who are at present looking around for some means of satisfying the new requirements in reference to educational handwork throughout the school, to the facilities afforded by the Educational Handwork Association in the Summer Holiday Course at St. Andrews. The teachers are all experienced and enthusiastic advocates of handwork. The remarkable success of last year's course (*vide* Association's Annual Report) justifies the expectation of a greater success this year, and intending students should apply for forms of application as soon as possible. We would call special attention to the extra subjects to be taught by Miss Jenny Andrén of Naas, Sweden.

FOR THE KNITTING LESSON.

A DISHCLOTH.

THIS useful article is made of *three strips* of knitting, graduated in difficulty, the making of which teaches *all that the Code now requires*, and consequently prevents much waste of wool whilst children are learning.

The strips should be just 17 inches long, and be sewn strongly together when finished. I have had these dishcloths made in my own school for many years, and find no difficulty in disposing of them when finished. I use Street's unbleached knitting cotton No. 6, pins No. 14 or 15.

Directions.

For First Strip.—We cast on thirty stitches, and knit quite plain for 9½ inches, being most careful always to slip the first stitch. Then knit plain for 7½ inches, *with chain edge*, and cast off.

For Second Strip.—Cast on thirty-one stitches, and knit quite plain for fifty rows ; then knit and purl forty alternate rows. Now rib two plain, two purl, for thirty-six rows. There is one stitch over. Next we have the "back of a stocking." The plain part is, of course, the same side as our first piece of plain. We had thirty-one stitches, which has given us the middle one for the seam-stitch ; so, as we are using only two needles, it is always knitted : knit twenty-six plain rows.

Intakes.—Knit twelve, slip one, knit one, pass the slipped stitch over the knitted one, knit one, knit the seam-stitch, knit one, knit two together, knit twelve. We leave five rows between each intake, and make three intakes. Then we do thirteen more alternate plain and purled rows, to teach "finishing the ankle," and now do the stitch used in thickening a heel* till the strip is long enough ; and end with a plain row, to prevent its curling up.

For Third Strip (*which teaches the Stocking*).—Cast on forty-seven, and rib one plain, one purl, for thirty rows : it must be a different rib from the one in second strip. Now we knit and purl alternate rows, making the middle stitch the seam-stitch : this for thirty rows, and then the first intake ; five rows, and then the second intake ; seven, and then the next ; nine, and then the next ; and so on until we have done six intakes. Now do a plain piece representing ankle of a stocking, with alternate knitted and purled rows until the strip measures 13½ inches. Do a thickened heel thus :—First row—Purl sixteen, slip the seventeenth stitch from the left to the right needle without knitting it ; purl the next, which is the seam-stitch (or knit if we have arranged that turn) ; slip the next, purl the rest. Next row plain. Third row—Purl fifteen, slip one, purl one, seam-stitch, purl one, slip one, purl the rest. Next row plain. Fifth row—Purl fourteen, slip one, purl one, slip one, seam-stitch, slip one, purl one, slip one, purl last fourteen. Next row plain. Seventh row—Purl thirteen, slip, purl, slip, purl, seam-stitch, purl, slip, purl, slip, purl the last thirteen ; and so on in every purled row, doing one stitch less before beginning to slip, and the stitches at each side of the seam-stitch correspond. Never slip the seam-stitch. When all the heel is thickened turn it ; do not thicken the turn. Take two more pins, and cast on forty-two extra stitches, knitting in rounds instead of rows, and make two instep reductions with two rounds between each intake. Two rounds, and cast off. The end of the straight heel-piece of No. 3 must come when strips are sewn firmly together, even with thickened heel of No. 2.

* At purling side—Slip one, purl one, slip one, purl one, to the end of row. Second row—Plain knitting. Third row—Purl one, slip one ; and so on, being careful that the stitch which was slipped in the last purled row is the one purled in this row. Leave off thickening at turn of heel.

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OUR TUTORIAL SECTION

OUR PUPIL TEACHERS' AND SCHOLARSHIP COURSE.

BY ARTHUR T. FLUX,

Head-Master of the Belvedere Pupil Teachers' Centre, First on Scholarship List, Author of "Scholarship School Management."

SPRING EXAMINATION, 1901.

Second Month—June.

WORK TO BE PREPARED.

1. READING AND RECITATION.

A FEW minutes each day should be devoted to these subjects. The reading out of the prescribed book should be oral, before a competent critic; but no pupil teacher should limit himself to this. An earnest student will make himself acquainted with as many as possible of the numerous masterpieces of English literature, and should, in addition, keep himself posted in passing events, especially those which will make history in the future. I shall be pleased to send to any one using this course a list of suitable books, which can be obtained either from a free library, or, preferably, bought for a few pence.

2. ENGLISH.

Candidates.—*Marmion*, Canto vi., lines 130–230.

First Year.—*The Traveller*, lines 51–98, with derivations of all important words, or twenty roots and meanings per week.

Second Year.—*Julius Cæsar*, from Act i., Scene 2 ("I will do so," etc.), to the end of Act i.

For full notes on English, see June number, 1899.

Essay Writing.

Write one or two essays each week, on such subjects as:—Money; A Steamship; Insects and their Uses; Good Manners; Children's Games; Printing.

3. HISTORY.

Candidates.—For this month prepare The Norman kings.

Note carefully the changes resulting from the Conquest, and obtain a clear idea of the Feudal System and its working. Henry's Charter, the Investiture Dispute, and the civil war between Stephen and Matilda, must be thoroughly mastered. Enter in notebooks and learn brief lives of Lanfranc, Anselm, Hereward, Robert of Normandy, and Flambard.

First Year.—William I. to Stephen—as Candidates.

Second Year.—Charles I.

Notes.—A full note on the *Norman Conquest* will be found in last June number of THE PRACTICAL TEACHER. A question was asked in the recent examination on the difference between the feudal system in England and that on the Continent. The question is perhaps a little beyond what might be fairly expected, but a few words on the subject may be given.

When William found himself master of England, he was sufficiently astute not to introduce into the country the difficulties of the system as he had seen it on the Continent. France and Germany were divided into feudal estates, and the various dukes, marquises, counts—or whatever their title happened to be—swore homage, indeed, to their reigning sovereign, but the oath was variously kept. Each baron's estates lay together in a compact mass, and he was practically an absolute ruler. William himself had defied his feudal superior; and other magnates felt very little dependence on, or care for, the monarch. The rule of the latter extended little beyond his personal possessions, and it was in many cases quite beyond his power to reduce a turbulent vassal to submission. The minor vassals had no regard for the king. They swore fealty to their duke, and him they followed, even against his superior.

William took care to prevent such a state of affairs in England. He made large grants of land to some of his chief supporters; but he took care that their estates were in different parts of the country, so that it was difficult for them to collect all their retainers without his knowledge and consent. Further, by the famous Salisbury Decree, 1086, he enacted that every knight should be *his* man in preference to all other claims. By this means, if a powerful subject strove to make war on the king, the vassals of the former were, according to their oath, bound to support the king against him. Subsequent monarchs were not wise enough to see that this division of estates was maintained; for later we find that, by purchase, intermarriage, exchange, etc., many of the great barons had succeeded in making nearly all their lands conterminous.

The Investiture Dispute was something more than the question as to whether the king or the Pope should invest a prelate. It must be borne in mind that investiture was of two kinds—(*a*) *Spiritual*, by means of the ring and crozier; and (*b*) *Temporal*, by which the prelate was put into possession of vast estates. The contest arose over the latter. If the Pope invested for temporalities, then the bishop or abbot paid dues, etc., to him, and the king had no claim on the lands at all. As the church held many lands, and as the king's revenue depended upon feudal incidents, it was but natural that the king, especially such a clear-sighted man as Henry the First, should insist on the prelates being *his* vassals and not the Pope's. It will be seen that he carried his point. This was the first of a long series of struggles by which the Norman and Angevin kings rescued the English Church from the complete domination of the Pope.

Charles the First.—The Stuart theory of the Divine Right of Kings, which James the First had carefully instilled into his son, bore ample fruit in this reign. James was too much of a coward to push his theory into full practice; but Charles was a man of a different stamp. The feeling of independence in the Commons, which had shown itself in the previous reign, grew rapidly in this one; and in proportion as the king endeavoured to extend his prerogative, so the resistance to illegal acts hardened into an obdurate and emphatic refusal to submit. The first three parliaments produced little good except the Petition of Right, acceptance of which was wrung from the king by his perennial want of money. During the period of absolute rule, money was obtained in various ways, some legal, some doubtful, and some clearly illegal. The Star Chamber, originally instituted for the settlement of disputed possession of lands after the Wars of the Roses, and the Court of High Commission, originally intended for the control of church matters, were both used as means of levying money by fines. Fines were imposed for not receiving knighthood, for encroachment on forest (Royal) lands, for cottages built on less than four acres of land, for gentry who resided in London instead of on their estates. The city of London was fined £100,000 for extension beyond due limits. Patents of monopolies, notwithstanding previous condemnation, were sold; forced loans and benevolences were extorted; and the ancient tax called ship-money was revived. Over this latter Hampden made a great fight. Although all these means failed to bring in as much money as the king desired, there seemed to be a reasonable prospect of the king becoming entirely absolute, when he made a grave mistake. A nation will bear heavy and unjust taxation, will submit to see time-honoured laws and customs broken, but will not submit to interference in spiritual matters. Acting under the advice of Laud, Charles attempted to force the English Church institutions upon his Scotch subjects. Their resistance compelled him to call the Long Parliament, and ultimately led to his execution. The Civil War must be carefully studied. A map of England should be drawn, and all places mentioned should be inserted.

4. GEOGRAPHY.

Candidates.—England: physical features—coast, rivers, mountains and hills, lakes, plains.

First Year.—France, Spain, and Portugal.

Second Year.—Finish Africa, with exception of the British Possessions.

5. ARITHMETIC.

Candidates.—Compound practice.

First Year.—Application of fractions to money, weights, and measures. Decimals: reduction of fractions to decimals; addition, subtraction, multiplication, and division.

Second Year.—Compound proportion.

Note.—Which vulgar fractions can be exactly represented by decimals, and why? The answer to this question depends upon a clear appreciation of what a decimal fraction is. A decimal fraction is a particular class of vulgar fractions—namely, all those which have ten or some power (*not* multiple) of ten for the denominator, the latter not being expressed. It follows, then, that if the denominator of any vulgar fraction can be multiplied by any number which will make it a power of ten, it can be expressed as a finite decimal. Now as 2 and 5 are the only factors of 10, such a denominator must contain no other factor; for it is evident that in a case like $\frac{7}{3}$, there is no number by which the 7 can be multiplied which will produce a power of 10. From these considerations we state the rule,—

If the denominator of a vulgar fraction in its lowest terms be resolved into prime factors, and these contain no other figures than 2 or 5, the fraction may be expressed as a finite decimal, and not *otherwise.*

If a fraction does not produce a finite decimal, it must produce a recurring decimal. For example, $\frac{1}{19}$ must recur at the nineteenth figure in the quotient; for there can be only 18 different remainders to the division, and at the nineteenth place one of the 18 is bound to occur again. This part of the work must be carefully studied.

The following are solutions to some of the questions set at the recent examination.

Notes on the Arithmetic Papers in the April Examination.

Candidates.

2. Simplify— $\frac{215{\cdot}4423}{{\cdot}267} - \frac{2154{\cdot}423}{2{\cdot}67}$.

If the first fraction be multiplied, numerator and denominator, by 10, its value is not altered, and it becomes the same as the second fraction. The difference between them is therefore 0.

Ans. 0.

4. *A does a piece of work in 3 days, B in 4, C in 6, while D's day's work is the average of the other three. How many days would D take to do the work?*

A does a piece of work in 3 days, ∴ he does $\frac{1}{3}$ per day.
B " " 4 " ∴ " $\frac{1}{4}$ "
C " " 6 " ∴ " $\frac{1}{6}$ "

∴ D does $\frac{\frac{1}{3}+\frac{1}{4}+\frac{1}{6}}{3}$ per day $= \frac{1}{4}$,

and therefore he would do the whole work in 4 days. Ans. 4.

1. *Multiply in the usual way 789 by 803 and 789 by 197, and show how, by adding the results together, the accuracy is confirmed.*

The answer is evidently $789 \times (803+197) = 789 \times 1000 = 789000$.

If this result is obtained by two separate multiplications, both are presumably correct, for it is hardly probable that a mistake in one sum would be counterbalanced by a mistake of the opposite kind in the other.

First Year.

1. *Keeping the order of the factors, and working in the usual way, multiply 987 by 3008 and 987 by 6992. Also, show—*

(1.) *That by adding the results together their accuracy is confirmed but not absolutely proved, even if you add correctly.*

(2.) *How, before multiplying, we can see that every line of the working of these multiplications will be a multiple of 3, that four lines will be multiples of 9, and two lines multiples of 27.*

$$987 \times 3008 + 987 \times 6992 = 987 \times (3008 + 6992) = 987 \times 10000 = 9870000.$$

As in preceding sum, if this is obtained by adding the two separate results, the working is *confirmed* but not *proved;* for if there were, say, 27 too little in the first result and 27 too much in the second, the errors would not be detected. Such a case is, however, hardly likely to occur.

(3.) *Every line in the working will be a multiple of 3, because 3 is a measure of 987.*

The lines, when 987 is multiplied by 3 (in 3008) and 6.9.9 (in 6992), must be multiples of 3×3, or 9.

The lines, when 987 is multiplied by 9 (in 6992), must be multiples of 3×9, or 27.

2. *Suppose the price of land per yard to be fixed. I have just enough money to buy an acre, but I wait, putting my money out at simple interest. In three years I buy with the capital and interest 1·09 acres. By how much per cent. does my land exceed an acre, and what was the rate of interest?*

Taking the original money as 1, the interest in three years is ·09, or ·03 for one year, or 3 per cent.

1·09 acres exceed 1 acre by ·09, or 9 per cent.

3. *Find, in the simplest way you can, the difference between £24, 17s. 4d. × 7·02 and £24, 17s. 3d. × 7·03.*

£24, 17s. 3d. × 7·03.
£24, 17s. 3d. × 7·02 + (1d. × 7·02).
Difference = £24, 17s. 3d. × ·01 − 7·02d.
= 4s. 11·67d. − 7·02d.
= 4s. 4·65d. Ans. 4s. 4·65d.

4. *Divide a franc among A, B, and C so as to give A 20 centimes less than B and C together, and so as to give B 1·4 times as much as C. (Show reasoning fully.)*

1 franc = 100 centimes.

Give B and C 20 centimes, and divide the remainder equally. Then A gets 40 centimes, and B and C together 60 centimes.

Now B gets 1·4 to C's 1,
or 14 " 10,
or 7 " 5.

∴ B gets $\frac{7}{12}$ of 60 = 35, and C gets $\frac{5}{12}$ of 60 = 25.

Ans. A = 40, B = 35, C = 25.

Second Year.

2. *A square is enclosed by 100 hurdles. It is altered to an oblong with 10 hurdles in one end, all the 100 hurdles being still used. Has the enclosed area become greater or less, and by how much per cent.? What is the difference, expressed as a fraction of an acre, if each hurdle is 11 feet long?*

In the case of the square there are 25 hurdles to each side, and the area $= 25^2 = 625$.

In the case of the rectangle there are 10 hurdles at one end, 10 at the other, and 40 on each side. The area therefore is $40 \times 10 = 400$.

The area is therefore less by $625 - 400 = 225$.

On 625 there is a decrease of 225.
" 1 " " $\frac{225}{625}$.
" 100 " " $\frac{225 \times 100}{625} = 36$.

Ans. 36 per cent.

If each hurdle is 11 feet,

Area of the square $= (25 \times 11)^2 = 625 \times 121$ sq. feet.
Area of rectangle $= (10 \times 11 \times 40 \times 11) = 400 \times 121$ "
Difference $= 225 \times 121$ "

As fraction of an acre $= \frac{225 \times 121}{4840 \times 9} = \frac{5}{8}$ acre.

3. *A sum of money is invested, and the interest at the end of the first year amounts to £70, 8s. 4d. This is added to the principal, and the interest on the total at the end of next year, at the same rate, amounts to £73, 4s. 8d. Find the rate of interest and the original capital.*

Of the £73, 4s. 8d. it is evident that £70, 8s. 4d. is the interest on the principal, and £2, 16s. 4d. is the interest on the interest, £70, 8s. 4d.

∴ Interest on £70, 8s. 4d. = £2, 16s. 4d.

" £1 $= \frac{\text{£2, 16s. 4d.}}{\text{£70, 8s. 4d.}}$

" £100 $= \frac{\text{£2, 16s. 4d.}}{\text{£70, 8s. 4d.}} \times 100 =$ 4 per cent.

To find original sum :—

Sum to produce £4 = £100.
" " £1 = £25.
" " £70, 8s. 4d. = £70, 8s. 4d. × 25
= £1760, 8s. 4d.

5. Express

$\frac{(\cdot25 \times \cdot25) - (\cdot24 \times \cdot24)}{\cdot49}$ cubic yards − $\frac{\cdot49}{(\cdot25 \times \cdot25) - (\cdot24 \times \cdot24)}$

of ·001$\dot{6}$ cubic feet, as a fraction of a cubic foot.

$$\frac{(\cdot25 \times \cdot25) - (\cdot24 \times \cdot24)}{\cdot49} - \frac{\cdot49}{(\cdot25 \times \cdot25) - (\cdot24 \times \cdot24)} \text{ of } \cdot001\dot{6}$$

$$= \frac{(\cdot25 \times \cdot25) - (\cdot24 \times 24)}{\cdot25 + \cdot24} \text{ cubic yards} - \frac{\cdot25 + \cdot24}{(\cdot25 \times \cdot25) - (\cdot24 \times 24)} \text{ of } \cdot001\dot{6} \text{ of 1 cubic foot}$$

$$= (\cdot25 - \cdot24) \text{ cubic yards} - \frac{1}{\cdot25 - \cdot24} \text{ of } \cdot001\dot{6} \text{ cubic feet}$$

$$= \cdot01 \text{ cubic yard} - \frac{1}{\cdot01} \text{ of } \cdot001\dot{6} \text{ cubic feet}$$

$$= \cdot27 \text{ cubic feet} - \cdot000016 \text{ cubic feet}$$

$$= \cdot269983 \text{ cubic feet} = \frac{232985}{900000} = \frac{48197}{180000}. \quad \text{Ans.}$$

6. Euclid and Algebra.

First Year.—Euclid, Props. 1-4.
Algebra—Use of brackets, and addition.
Second Year.—Euclid, Props. 30-34, with four deductions each week.
Algebra—L.C.M. (Solve by means of factors.)

7. Music.

Candidates.—Standard scale of pitch. Mental effects, and their modifications.
First Year.—Bridge notes. Six and nine pulse measures.
Second Year.—The intervals of the minor scale.

8. Teaching.

Practise the capital letters on the blackboard, after reading up the rules, etc., given in *The Practical Teacher Copy Book.*

Test Questions.

1. *Penmanship.*
Large Hand :—*Alphabetically.*
Small Hand :—*An honest man's the noblest work of God.*

2. *Candidates.*—Analyse, and parse words in italics :—

" *Once walking* thus, at evening tide
It chanced a gliding sail she spied,
And *sighing*, thought, The abbess *there*
Perchance does to her home repair."

How do you account for the difference between the meaning of *repair* as used in this passage and that in the following sentence—To-morrow he will repair the damage?

First Year.—Paraphrase and analyse, and parse words in italics :—

" But *me*, not destined such delights *to share*,
My *prime* of life in wandering spent and care,

Impelled, with steps unceasing, *to pursue*
Some fleeting *good* that mocks me with the view
That, *like* the *circle* bounding earth and skies,
Allures from far, *yet*, as I follow, flies,
My fortune leads to traverse realms alone,
And find *no* spot of all the world my *own*."

Comment on the case of *prime* in the above passage. Is Goldsmith's complaint as given here quite just and correct?

Second Year.—Paraphrase and analyse—

"And it is very much lamented of Brutus.....
Have wished that noble Brutus had his eyes."

And parse—*very, as, where, many, speaking, have wished.*

Point out the various feelings to which Cassius appeals in his talk with Brutus.

3. *Candidates.*—What right had Alfred to the title of Great? *Or*, Give an account of the work of Dunstan.

First Year.—What do you know of the Danish invasions? *Or*, In what way was the Norman Conquest made easy by preceding events?

Second Year.—Say what you can of the Puritans and their opposition to James the First. *Or*, Give some account of the plots against James the First.

4. *Candidates.*—Say what you can of the Atlantic Ocean.

First Year.—What do you know of the various races of Europe?

Second Year.—Give some account of the present state of Egypt. How has the British occupation affected it? What great works are now in progress?

5. Give rules which you would observe in correcting dictation exercises of children.

AUTUMN EXAMINATION, 1900.

Ninth Month—June.

WORK TO BE PREPARED.

1. READING AND RECITATION.

Continued oral practice for those not yet examined, and private reading of any good English classic. One good book should be read each month.

2. ENGLISH.

Candidates.—*Marmion*, Canto vi., lines 902 to 1021.

First Year.—*The Traveller*, lines 377 to 412. Twenty roots and meanings each week. Derivation of all important words in the passage set for preparation.

Second Year.—*Julius Cæsar*, Act v., Scenes 1, 2, and 3. For *Notes*, etc., see January number of THE PRACTICAL TEACHER.

(All pupil teachers should use "The Pupil Teachers' English Notebook." (*T. Nelson and Sons.*)

3. ESSAYS.

Write one or two essays each week, selecting from the following:—Social Life in Norman Times; A Winter Evening; Snow; Fairy Tales; The "Good Old Days" compared with the Present Time; Autumn Flowers; The Use of Pictures in School; Patriotism.

4. HISTORY.

Candidates.—George III.
First Year.—Henry VIII.
Second Year.—George III. (1800 to 1820) and George IV.

5. GEOGRAPHY.

Candidates.—Ireland: physical features, climate, and productions.
First Year.—India: physical features, climate, and productions.
Second Year.—Australia: physical features, climate, and productions.

6. ARITHMETIC.

Candidates.—General practice in problems on the year's work.
First Year.—The metric system.
Second Year.—Mensuration of rectangular solids.

7. EUCLID.

First Year.—Revise definitions, axioms, and postulates, and Props. 1–10, with six deductions each week.

Second Year.—Revise Props. 17–26, with eight deductions per week.

8. ALGEBRA.

General practice. All back questions should be worked. Special attention should be given to factors.

Notes on the Work for the Month.

1. HISTORY.

Candidates.—George the Third. This long reign will require much attention. It falls into three periods:—(*a*) 1760–1783. The Seven Years' War finished in 1763. The selfish commercial policy of the mother country, and the attempt to impose the burden of taxation on the American colonies without giving them representation, led to the War of Independence, and finally the loss of the States to us. France joined the States, not from love of their principles, but from hatred to us, and a desire to avenge the loss of Canada. (*b*) 1783–1802. During this period we have the outbreak of the French Revolution, and the European war which ensued. The life of Pitt must be prepared. (*c*) 1802–1820. The second phase of the struggle, now against an individual—Napoleon. Note the importance of Nelson's victories: the Nile prevented the threatened invasion of India; Copenhagen prevented the co-operation of the combined fleets of the North; and at Trafalgar the French fleet was not only defeated, but absolutely destroyed, and all fear of invasion was at an end. The Peninsular War was the first series of reverses suffered by Napoleon, who was finally defeated at Waterloo. Learn lives of Nelson, Bonaparte, and Wellington. The union with Ireland, and the general depression following the long war, should be noted.

First Year.—Henry the Eighth. Chief points:—The jealousies of the Emperor and the King of France enabled Henry the Eighth to hold the balance of power; hence Field of Cloth of Gold. Henry's marriages and Battle of Flodden must be noted. The other events centred round the Reformation. The following points must be clearly grasped:—

1. What the Reformation *was*. The exact points on which the Reformers differed from the Romish Church.
2. Henry's attitude—*not* a reformer. (See Statute of Six Articles.) Supremacy claimed simply to further the divorce. Reformers and orthodox Catholics punished at the same time.
3. Dissolution of monasteries—(*a*) as calculated to displease the Pope; (*b*) to enrich the king with the confiscated lands. Result—much discontent among the poor.

Second Year.—Chief points:—Continental wars. War in the Peninsula. Battle of Waterloo. Prepare plan and detailed account. Note carefully the results of the war, enormous cost, consequent depression.

2. GEOGRAPHY.

In learning the physical features of a country, abundant use should be made of sketch-maps, which must be drawn and redrawn till known thoroughly. Endeavour to find reasons for any peculiarity in climate—for example, the great humidity of Ireland, the monsoons of India, the dry interior of Australia. Reason out the productions from the climate. Tabulate as Animal, Vegetable, and Mineral, with such subdivisions as necessary. For example, the animals may be arranged thus:—

1. Quadrupeds—(*a*) Wild; (*b*) Domestic. 2. Birds. 3. Fish. 4. Reptiles. 5. Insects.

A clear, well-arranged page of the notebook will help much in fixing facts in the memory. Whatever extra time is spent in carefully analysing and tabulating *now*, will be more than gained in the future.

3. ARITHMETIC.

The metric system will need a little care, but there is no real difficulty when once the nomenclature is mastered. The English equivalents for the various units should be committed to memory. It is by working numerous examples, rather than by reading up theory, that the system becomes well known and easy.

Students must send up any difficulties they meet with, but those who have worked through the excellent set of examples in Christian and Collar's *Arithmetic* need not trouble to find further examples.

The solutions to some of the sums set at the last examination, given in the course for spring examination above, should also be studied.

Test Questions.

1. *Penmanship.*
Large Hand:—*Energetically.*
Small Hand:—*How small of all that human hearts endure*
The part which laws or kings can cause or cure!

2. *English.*
Candidates.—Analyse, and parse words in italics:—

(*a*) "Ask me not *what* the maiden feels,
Left in that dreadful hour *alone.*"

(*b*) "And *such* a yell was *there*,
As if men fought upon the earth,
And fiends in *upper* air."

First Year.—(*a*) Paraphrase lines 349–360.
(*b*) Analyse, and parse words in italics:—

"*Yet* think not, *thus* when Freedom's ills I state,
I mean to *flatter* kings or court the *great*;
Ye powers of truth that bid my soul *aspire*,
Far from my bosom drive the low desire."

(*c*) Write a character of the Dutch as depicted by Goldsmith.
Second Year.—(*a*) Paraphrase Act iv., Scene 3, lines 210–222:—

"You must note beside.....
Or lose our ventures."

(*b*) Analyse the same passage.
(*c*) Parse:—"I have as much of this in art as you,
But yet my nature could not bear it so."

3. *History.*
Candidates.—Say what you can of the causes and results of the Seven Years' War.
First Year.—By what means did Henry the Seventh amass money? What was his object in so doing?
Second Year.—Explain clearly the causes which led to the loss of the American colonies.

4. *Geography.*
Candidates.—Mention ten manufacturing towns in Scotland. Describe their position, and add something about their manufactures.
First Year.—Say what you can of Afghanistan under these heads: (*a*) People and Industries; (*b*) Government; (*c*) Political Importance.
Second Year.—What do you know of the Llanos, Selvas, Pampas, El Gran Chaco, Titicaca, Aconcagua, Valparaiso, and La Plata?

SCHOLARSHIP EXAMINATION, 1900.

Sixth Month—June.

WORK TO BE PREPARED.

1. *Reading, Repetition, and Penmanship.*—A few minutes' practice each daily.
2. *Theory of Teaching.*—Chap. ix., *Scholarship School Management.*
3. *Geography.*
(1.) Revise Siberia, Japan, Indo-China, and East Indian Archipelago.
(2.) Cape Colony and Natal.
4. *History.*—James the First to the Restoration.
5. *Composition.*—One or two essays each week, on such subjects as—The Use of Coaling Stations; The Difficulties of Exploration in Central Asia; The Political Importance of Afghanistan; The Uses of Fresh Air; The Character of the Tudor Sovereigns; Courtesy.
(A prize of five shillings will be given to candidate sending up for criticism an *original* fairy tale. The length should not exceed fifty lines of foolscap.)
6. *English.*
(1.) The grammar and syntax of the preposition and conjunction.
(2.) Twenty roots and meanings per week.
(3.) The history of the language from 1750 to 1800.
(4.) *Julius Cæsar*, Act iv., Scenes 1, 2, and 3—as far as,
"He'll think your mother chides, and leave you so."
7. *Arithmetic.*—Simple interest, compound interest, and discount.
8. *Algebra.*—Ratio and proportion.
9. *Euclid.*—Book I., Props. 1–4, with six deductions per week.
10. *Elementary Science.*—Elementary properties of chlorine, sulphur, phosphorus, and marsh gas.
11. *Languages.*

Latin, *Pliny's Letters*, No. 7. French, *Le Trésor*, three pages.	Translation, retranslation. Exercises in grammar and composition.

12. *Drawing.*—A freehand copy each week.
13. *Music.*—Chap. vi., *School Music Teacher.*
14. *Domestic Economy.*—Rules for the preservation of health.

Notes on the Work for the Month.

1. *Geography.*—Russian extension and influence in Northern China should be noted carefully. Railway activity is the chief interest of Siberia of to-day. The great railway has been opened all the way from Europe to Irkutsk, and the Manchurian railway, which will ultimately carry it to the coast of China, has been steadily proceeded with. In Russian Central Asia, the Transcaspian line has been extended in two directions—from Samarcand to Tashkend, and eastward towards Kashgar. An important branch has also been opened from a point near Merv to Kushk, on the borders of Afghanistan, within 95 miles of Herat. It has been pointed out that only 438 miles of railway would require to be constructed to allow of the journey from London to Karachi being made in one week by rail all the way, except for the Straits of Dover and the crossing of the Caspian.
Cape Colony.—Great attention is naturally being given to our possessions in South Africa, and the student should make a special study of these colonies. The following facts should be learned:—
Population (census of 1891), 1,599,960, of whom the Europeans, or whites, were 382,198.
The imports for 1898 were worth over sixteen and a half million pounds; the exports, twenty-four million pounds.
The chief articles of import were apparel, arms, books, carriages, cycles, cotton goods, hardware, leather, machinery, iron and steel, woollen goods, spirits, stationery, etc.
The chief exports were diamonds, wool and sheep, copper ore, feathers, hides.
Government.—The colony is under responsible government. There is a Governor appointed by the Crown, a Legislative Council of twenty-three elected members, and a House of Assembly of ninety-five elected members. The Governor of Cape Colony and High Commissioner for South Africa is Sir Alfred Milner.
Cape Town is 5,979 miles from Southampton; time of transit, eighteen to twenty days.
(Much valuable information can be obtained from the offices of the various lines of steamers running to the Cape, in the form of handbooks, official guides, etc.)

2. *History.*
James I. to the Restoration. Chief Points:—

James I.
(1.) *His Right to the Throne.*—Learn carefully a genealogical table to show this, and also his relationship with Lady Arabella Stuart.
(2.) *The Stuart Opinions.*—These are very important, as affecting to a large extent the trend of events for the next century. James was, as his tutor styled him, "the wisest fool in Christendom"—that is, he had a vast amount of book-learning, but very little common-sense. When he came to England he had no idea of the English character. He had assumed a belief which he was careful to expound at every opportunity, and which is best known as the "Divine Right"—*A Deo rex, a rege lex*—that is, the king is created by God, and is responsible to Him alone; and the law comes from the king. This doctrine of absolute monarchy (or of "passive obedience" on the part of the people) was not confined to civil matters, but was extended to religious affairs.
The three great sects—English Church, Catholics, and Puritans—all expected great help from James: the Catholics, because his mother was a Catholic; the Puritans, because he came from a Presbyterian country. But James was only too glad to shake off the yoke he had to bear in Scotland, and assume an absolute superiority in all questions of church government. He favoured the Established Church. "No bishop, no king," was his answer to those who attacked the prelacy. He was too much of a coward to put this Divine Right into practice, but it cost Charles the First his head.
(3.) *Lady Arabella Stuart Plot.*—Devised by Raleigh, who was imprisoned thirteen years for it, and was afterwards executed.
(4.) *Hampton Court Conference.*
Cause—The Millenary Petition of a thousand Puritan ministers.
History—Conference between leading men of Puritans and Episcopalians at Hampton Court, 1604. James took the chair and the greater share of the speaking. Abstruse argument was his strong point, and he enjoyed the opportunity of airing his knowledge.
Results—(*a*) A new translation of the Bible, which appeared in 1611.
(*b*) Some minor changes in the Prayer Book.
(5.) *Gunpowder Plot.*—Caused by the harsh manner in which James treated the Catholics. The result of the plot was to deprive Catholics of nearly all their civil rights.
(6.) *The Plantation of Ulster.*—After the rebellion of the Earls of Tyrone and Tyrconnell their lands were forfeited, and the greater part of Ulster fell into the king's hands. He conceived the idea of granting these lands to English and Scottish settlers on certain conditions (such as building a strong stone house, etc.) which would ensure the peace of the country. Ulster was thus successfully planted, with the result of ultimately making Ulster the most prosperous and peaceful part of the island, and of effectually destroying the trust of the Irish in English justice. To raise funds, James invented the title of Baronet, which he sold for £1,080.
(7.) *James and his Parliaments.*—James ruled as far as he could without a parliament, raising money by unjust and illegal means; but the growing power of Parliament was abundantly shown by their claim for freedom of speech, and by their successful attack upon Lord Bacon.
(8.) *Favourites.*—(*a*) Robert Carr, Earl of Somerset, disgraced, and died in poverty.
(*b*) George Villiers, Duke of Buckingham, a life of whom must be prepared.
(9.) 1622.—First newspaper started—*The Weekly News.*
1620.—The Pilgrim Fathers land in America.

Charles I.
Every endeavour must be made to trace all the causes which had been at steady work for centuries, and which helped to bring about the crisis of 1642.

The gradual growth of the Commons from the time of De Montfort, the disappearance of the bold and independent Baronial party after the Wars of the Roses, the servility of the new (and in many instances corrupt) nobility, the Revival of Learning, the Reformation, the wonderful growth of the Puritans, and the personal character of the Stuarts themselves, with their absurd theory of "Divine Right," all tended to the inevitable conclusion of a struggle for final supremacy between the people and the Crown.

For this month read up carefully the history of the early struggles, the Three Parliaments, the Petition of Right (properly considered the second Magna Charta), and the eleven years of absolute rule. Note the chief men of the period and their influence, the means by which Charles raised money, the question of Ship-money, and the meeting of the Long Parliament.

Note carefully the course of events between 1646 and 1649, and observe how the power changed hands from Parliament to the Army. Prepare the following:—

A.—Means by which money was raised during the years of personal rule.

1. Legal but vexatious.
   - (*a*) Fines for not receiving knighthood levied on freeholders above £40 a year.
   - (*b*) Fines for defective titles to estates.
   - (*c*) Fines for encroachment on forest lands.
   - (*d*) Fines for all cottages on less than four acres of land.
   - (*e*) City of London fined £33,000 for neglect in investigating into the death of Dr. Lamb.
2. Measures of doubtful legality.
   - (*a*) Proclamation for all gentry to leave London and reside on their estates. Fines for non-compliance.
   - (*b*) City of London fined £100,000 for extension beyond limits assigned by Charter.
   - (*c*) Exaction of customs duties.
   - (*d*) Fines imposed in Star Chamber.
3. Measures clearly illegal.
   - (*a*) Selling of patents of monopoly.
   - (*b*) Demands for loans and benevolences.
4. Ship-money.

B.—Migration to America.

1620.—Landing of Independent Separatists at Plymouth in the *Mayflower*.

1629.—Charter granted by Charles to the Company of Massachusetts Bay.

Great migration of Puritans, especially from the eastern counties.

1634.—Attempt by the Privy Council to stop emigration.

1633-1638.—Foundation of Maryland by Lord Baltimore on a basis of toleration (Green).

C.—Social Improvements.

In 1635 the first *Letter Post* was established. Before that, letters had been sent by special messengers, by the sheriff's men, and by carriers. The post was further regulated by an Act passed in 1640, which established a General Post Office in London to collect letters and send them all over the kingdom and beyond the seas. The king was to appoint a Postmaster-General, and his agents alone were to have the right to dispatch letters, common carriers and shipmasters being the only exceptions to this rule; he was also to provide horses for riding post. Letters were to be carried at the rate of twopence a sheet for eighty miles, to be paid on delivery. Under the Commonwealth the postal arrangements were farmed out, but the Act of 1660 was confirmed in the first year of Charles the Second. From that time dates the privilege of members of Parliament to frank letters by signing them, which allowed them to go free—a privilege which was enormously abused.

The Commonwealth.—The point of greatest interest in this period—after Scotland and Ireland had been reduced—is the remarkable vigour and determination of Cromwell's foreign policy. He raised England to the highest esteem of European nations. The causes should be noted why, on the death of the Protector, the country was nearly unanimous in demanding the recall of the king.

Test Questions.

1. *Penmanship.*
   Large Hand:—*New Zealand.*
   Small Hand:—*Barefooted came the beggar maid*
   Before the king Cophetua.
2. Explain clearly the objects of teaching grammar in schools.
3. Say what you can of Persia under these heads—(*a*) Extent and Population; (*b*) Industries; (*c*) Chief Towns; (*d*) Government.
4. What do you know of the original inhabitants of New Zealand, and of our dealings with them?
5. What were the relations between England and Scotland during Tudor times?
6. Analyse the following, and parse the words in italics:—
   "And *as* he plucked his cursèd steel away,
   Mark *how* the blood of Cæsar followed it,
   As rushing out of doors, *to be resolved*
   If Brutus so unkindly knocked, *or no.*"
7. (1.) A person selling apples at 3 for a penny gains 5 per cent: find the gain or loss per cent. when 25 are sold for sixpence. Ans. 24⅔ loss.

   (2.) A tradesman's prices are 20 per cent. above cost price: if he allows a customer 10 per cent. on his bill, what profit does he make? Ans. 8 per cent.

   (3.) A tradesman who makes 15 per cent. on his capital makes a profit three times as great as another who makes 12 per cent. in the same time. They unite their capital, and the joint capital is £867, 4s. 3d. What amount did each contribute? Ans. { £612, 3s. 0d. / £255, 1s. 3d.

   (4.) A man embarks his capital in four successive ventures. In the first he clears 100 per cent., and in each of the others he loses 20 per cent. What profit on his original outlay remains to him? Ans. 2⅔ per cent.
8. What do you understand by magnetic elements?
9. Name the intervals made by each of the following notes with the others—**doh, bah, se, lah.**
10. Give definite rules for the proper way to dust a sitting-room.

CORRESPONDENCE: RULES.

To ensure an answer in the next issue, queries must be sent by the 15th of each month.

Name and address of sender, with coupon of current number of THE PRACTICAL TEACHER (and *nom de plume* if desired), must be enclosed.

As a rule, all replies will appear in the Correspondence Column; but any one desiring an immediate reply may obtain it by enclosing a stamped addressed envelope.

All communications and queries with regard to the PUPIL TEACHERS' AND SCHOLARSHIP COURSE should be addressed to "Mr. A. T. FLUX, The Bays, Belvedere, Kent."

ANSWERS TO CORRESPONDENTS.

Poppy.—Essay good, 45/50.

Failure.—Essay very good, 55/60.

Kharki.—You get *no* marks for any success in science taken at the June examinations. A paper is set at Scholarship. (See the syllabus.)

B. W. D.—Penmanship, 50/60; arithmetic, 20/20; geography, 18/20.

S. P. T.—Essay, 45/60.

Rotha.—Essay, 45/60.

(*Other correspondents answered by post.*)

The prize of 5s. for the best description of "Your Native Town" has been won by Miss Alice Clegg, Scawthorpe, Doncaster. Many other essays were very good, the best being those of G. Wade and F. Shattock.

BOARD OF EDUCATION, WHITEHALL.

CERTIFICATE EXAMINATION, 1900-1901.

The Board of Education, in the Syllabus for Certificate Examinations just issued for 1901, state that

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will be prescribed. Students preparing for this Examination, as well as for London Matriculation, cannot do better than carefully study Mr. Collar's Edition of About's delightful work—

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OUR CERTIFICATE COURSE FOR 1900.

BY GEORGE COLLAR, B.A., B.SC.,

Head-Master of the Stockwell Pupil Teachers' School.

As the Certificate Examination begins on Monday, 2nd July, there remains just one clear month for final revision, and we can best assist our readers in this revision by setting papers in the various subjects on as nearly as possible the same lines as those they will have to face next month. Each paper should be attempted in the time allotted, and without previous reference to text-books, etc. After the expiration of the time, the work may be corrected with the help of text-books and books of reference, or submitted to the teacher, or sent up. When each subject has been treated in this way, the questions—both those which have been attempted and those which have not—should be utilised for their suggestiveness of points requiring to be looked up, and difficulties should be sent up as early in the month as possible.

We have received very gratifying expressions of recognition of the assistance afforded by this course to some of our readers, and trust it has been equally helpful to those who have not had occasion to write respecting any particular difficulties, and we wish eminent success to all in the approaching examination.

Candidates should read very carefully the regulations for the examination, which are issued at the head of each paper, respecting copying and the use of materials.

Before beginning each paper, note carefully the time allowed, and the number of questions which may be attempted, and distribute the time *fairly* among the questions; we do not say *equally*, since the more important questions can fairly claim more than the average allowance.

When a choice of questions is allowed, read through all thoughtfully before deciding which you will attempt. It sometimes happens that the wording of one question contains a suggestion for the answer of another. Again read each question through before answering it, and try to realise what are to be the points in the answer required; for a question is not an invitation to make a few remarks on the subject in general—it asks for certain definite information.

DICTATION AND PENMANSHIP (BOTH YEARS).

(Half an hour allowed.)

1. Ask a friend to dictate a passage of about two hundred words from such a writer as Macaulay.
2. Write as a specimen of large hand—*Irregularity.*
3. Write as a specimen of small hand—

A famous man was Robin Hood,
The English ballad-singer's joy.

ENGLISH COMPOSITION (BOTH YEARS).

(One hour allowed.)

Write in plain prose a short essay on one of the following subjects:—

(*a*) Lawful ambition.

(*b*) The great art of commanding is to take a fair share of the work (*Napier*).

(*c*) "Labour conquers all things."

THEORY OF TEACHING.

MEN AND WOMEN (FIRST YEAR).

(Three hours allowed. Answer seven questions.)

1. Write notes of a lesson on one of the following subjects:—
   (*a*) A Teacup (for infants).
   (*b*) Watercress (for infants).
   (*c*) Steam.
   (*d*) The Thermometer.
   (*e*) The Common Pump.
2. Give the requirements of the drawing syllabus for Standards V. and VI., and say what apparatus is required in teaching the subject to those standards.
3. To what extent is it necessary to teach geography in order to teach history effectively?
4. What is the difference between an object lesson and an elementary science lesson? Give a list of twenty object lessons suitable for Standard II.
5. How would you teach children what is meant by an indirect object? Show clearly how you would teach them to discriminate between an indirect object and a direct object on the one hand, and an extension on the other.
6. What precautions would you take, in teaching simple multiplication of integers, so as to save trouble when the children came to do multiplication of decimals?
7. What is meant by "expressive reading"? What steps must be taken in order to obtain it?
8. What is a fallacy? Name the classes in which fallacies may be arranged, and give examples.
9. What is a sorites? Give an example, and resolve it.
10. Explain the difference between contrary and contradictory statements.

MEN AND WOMEN (SECOND YEAR).

(Answer seven questions.)

1. How does a child first obtain an idea of self? Trace the development of the idea.
2. Why does a certain course of action become easier through habit?
3. Analyse the mental processes involved in learning a verse of poetry by heart.
4. State concisely some of the common abuses of memory in teaching, and show in what way each one violates sound educational principles.
5. What are the mental processes which result in a judgment? Distinguish between intuitive and deliberative judgments.
6. Why does Plato attach so much importance to the teaching of music? What kind of music does he recommend, and what kind does he condemn?
7. What kinds of poetry does Plato condemn as being unsuitable for educational purposes?
8. Give a summary of Plato's recommendations with respect to physical training.
9. Discuss the place of moral precepts in education.
10. What rules must be observed in cancelling attendances of children who leave early? How are children registered who attend carpentry or cookery centres?

GEOGRAPHY (BOTH YEARS).

(Two and a half hours allowed. Answer Question 1 and six others. Illustrate when you can by sketch-maps.)

1. What changes were made in the division of Europe by the treaty of Utrecht? What were the states mainly affected? Mark in a map the territories of the Great Powers in 1713–14.
2. Describe the province of Silesia, and say what you can of its history during the eighteenth century.
3. The Austrian Empire is a combination of several nationalities. Name them, with the places which they inhabit. What is the form of government in the country?
4. Describe the course of the Rhine, and give some of the historical associations, with the towns on its banks.
5. Write about a page, interestingly, on *one* of the following subjects:—
   (*a*) The Counties Kerry and Wicklow.
   (*b*) The Founding of Venice.
   (*c*) A Voyage through the Mediterranean from Gibraltar to Port Said.
6. Where is Alsace-Lorraine? To which country does it now belong? Give a short account of its history during the eighteenth century.
7. Where is the inland drainage area of Europe? Compare it with that of (*a*) Asia; (*b*) North America.
8. Name the Great Powers of Europe; state the chief natural sources of wealth of each of them; compare them roughly in respect of population and area.
9. Where are the following towns; what special interest attaches to them:—Antwerp, Dettingen, Arles, Dresden, Milan, Aix-la-Chapelle, Culloden, Moscow, Fontenoy?
10. Give a concise account of the commerce of (*a*) France, or (*b*) Germany, or (*c*) Belgium.
11. What countries lie wholly, or in part, in the great Central Plain of Europe? What are the chief occupations of the people in various parts of the plain?
12. A vessel is bound from Marseilles to Hull. What cargo might she take on board at Marseilles, and what ports and river mouths would she pass on her voyage?

HISTORY (BOTH YEARS).

(Answer seven questions. Two and a half hours allowed.)

1. Write an account of the life and political work of Viscount Bolingbroke.

2. Trace briefly the campaigns of the Duke of Marlborough.
3. How was the War of the Austrian Succession caused? What part did England take in it, and what were its results?
4. Give an account of Walpole's legislative work. Criticise the Excise Bill.
5. Describe the struggle between the English and French for supremacy in North America.
6. Trace the rise of British power in India up to 1789.
7. What were the chief provisions of the treaty of Paris, 1783?
8. Discuss the constitutional principles which led to the American War of Independence. What were the chief causes which led to the success of the colonists?
9. Give an account of the life and political work of Pitt up to 1789.
10. Discuss the characters of two of the following:—Warren Hastings, George Washington, Charles James Fox, and the Duke of Marlborough.

Arithmetic.

Men (first year) and Women (first and second year).

(Two and a half hours allowed. Answer Question 1 and nine others.)

1. Answer three of the following:—
   (*a*) Define a decimal, a recurring decimal, a mixed recurring decimal, a square root, and a multiple.
   (*b*) State and prove the rule for dividing one vulgar fraction by another.
   (*c*) State as fully as you can, from inspection, what will be the nature of the decimals produced from the following vulgar fractions:—
   $\frac{5}{16}$, $\frac{7}{12}$, $\frac{4}{15}$, $\frac{11}{14}$, $\frac{17}{125}$, $\frac{9}{18}$, $\frac{13}{119}$.
   (*d*) What are the advantages of the metric system?
2. Show that every prime number (except 2 or 3) gives a remainder 5 or 1 when divided by 6.
3. Subtract 9·6183 of 9 oz. 13 dwt. from 3·2016 of 2 lbs. 5 oz. troy, and give the answer in grains and decimals of a grain.
4. Find the true discount on £1616, 2s. 8d., due $3\frac{3}{4}$ years hence, at 4 per cent. per annum.
5. Find the square root of $\dfrac{8\frac{1}{2} + 9\frac{1}{3} - 10\frac{1}{12}}{10\frac{2}{3} - 9\frac{1}{2} + 4\frac{5}{24}}$.
6. A man's income-tax at 7d. in the £1 exceeds his poor rate by £22, 10s., and after paying both his net income is £486 per annum. Find his gross income.
7. A runs 100 yards in 10 seconds, and beats B by 10 yards. If B had a start of 2 seconds, what would be the exact result of the race?
8. A owes £525 to B, and £587, 10s. to C. If he is charged 5 % and 4 % by B and C respectively, in how many years will the debts be equal?
9. I have to reach a certain place at 8 o'clock. I find that if I walk at $3\frac{1}{2}$ miles per hour I should get there at 7.45, but if I walk at 3 miles per hour I should not reach the place till $22\frac{1}{2}$ minutes past 8. How far is the place, and what distance should I travel at each of the rates in order to get there just in time?
10. A man holds £5000 stock in the $2\frac{3}{4}$ per cents., and £4000 stock in the $2\frac{1}{2}$ per cents. He sells out at $112\frac{1}{2}$ and $106\frac{3}{4}$ respectively, and invests the whole proceeds in 3 per cent. debentures at $98\frac{3}{4}$. What is the alteration in his income? (The brokerage is $\frac{1}{4}$ per cent. on each transaction.)
11. A pedestrian looked at his watch, and found the hands exactly opposite. He then walked 2 miles 368 yards, and again looked at his watch, and found the hands together. At what rate per mile was he walking?
12. A beam 18 feet long, and whose cross section is a square, contains 200 cubic feet of timber. What is its breadth?
13. Find the compound interest on £920 for 2 years at 4 per cent., the interest being payable half-yearly.

English Language and Literature.

Men and Women (first year).

(Three hours allowed. Answer two questions in each section.)

I.

1. Give ten examples of words that have changed their meaning, and account for the change if you can.
2. Explain, as to a class, the meaning of the grammatical terms, *apposition*, *enlargement of the subject*, *strong verb*, and give illustrations.
3. Write notes of a lesson on Mood.

II.

1. Give an account of Pope's relations with Bolingbroke, and show the effect of them on the *Essay on Man*.
2. Give a summary of the argument of Epistle I., and say where you think the reasoning is faulty.
3. Explain the following passages:—
   (*a*) "The first Almighty Cause
   Acts not by partial but by general laws."
   (*b*) "Why has not man a microscopic eye?"
   (*c*) "Our proper bliss depends on what we blame."
   (*d*) "Wits, just like fools, at war about a name."
   (*e*) "As Heaven's blest beam turns vinegar more sour."
   (*f*) "Scarfs, garters, gold, amuse his riper stage,
   And beads and prayer-books are the toys of age."
4. Quote lines from the *Essay on Man* which have passed into proverbs.

III.

1. Give instances in which Johnson's criticisms on Milton seem to you to be unduly severe, if not unfair. How do you account for Johnson's animus against Milton?
2. Write a short life of Milton based upon the facts recorded in Macaulay's *Essay* and Johnson's *Life*.
3. In what ways do Milton's poems reflect his religious and political opinions?

Men and Women (second year).

(Three hours allowed. Answer three questions from each section.)

I.

1. Justify the remark of Dr. Johnson that "the meek sorrows and virtuous distress of Katherine have furnished some scenes which may be justly numbered among the greatest efforts of tragedy."
2. Hazlitt says that Henry the Eighth "unites in himself all the vices of barbarism and refinement, without their virtues." Illustrate this by quotations from the play.
3. Explain the following:—
   (*a*) "My noble father, Henry of Buckingham,
   Who first raised head against usurping Richard,
   Flying for succour to his servant Banister."
   (*b*) "I have some of them in *Limbo Patrum*."
   (*c*) "Those remnants of fool and feather."
   (*d*) "Their very labour was to them as a painting."
   (*e*) "Methought I stood not in the smile of Heaven."
4. How does the evidence of "style" indicate that *The Tempest* is one of Shakespeare's latest plays? What allusions confirm this?
5. How does Shakespeare show his dramatic power in the creation of the character of Caliban?

II.

1. Give an outline of Milton's description of hell and hell torments.
2. Explain:—
   (*a*) "At last his sail-broad vans
   He spreads for flight."
   (*b*) "We are at worst
   On this side nothing."
   (*c*) "Titan, heaven's first-born,
   With his enormous brood."
   (*d*) "A boggy Syrtis, neither sea
   Nor good dry land."
   (*e*) "They ferry over this Lethean sound."
   (*f*) "The rebel king
   Doubled that sin in Bethel and in Dan,
   Likening his Maker to the grazèd ox."
3. Describe the principles of versification adopted by Milton in *Paradise Lost*. Give instances of irregularities, and say what effects are produced by them.
4. What use does Milton make in *Paradise Lost* (I. and II.) of Scripture history and pagan mythology for the purposes of the poem?
5. What do you consider the characteristics of Leigh Hunt's style as an essayist? Name some of the other English essayists, and compare them with Leigh Hunt.
6. What do you know of Leigh Hunt's life, and of his relations with poets who were contemporary with him?

Algebra and Mensuration.

(Three hours allowed. Answer nine questions. Second Year women taking Algebra as a substitute for Arithmetic should answer all the nine from the Algebra section; First Year men must answer one from the Mensuration section.)

1. Prove that the difference between the squares of any two consecutive numbers is equal to the sum of the numbers. Prove that $a^n - b^n$ is always divisible by $a - b$.

2. Resolve into factors—

(1.) $a^2(a-b)^2 - (a^2-b^2)^2$.

(2.) $a^4 - (b^2+2)a^2x^2 + x^4$.

(3.) $(3a-5b)^2 - 7(3a-5b)(x-y) + 10(x-y)^2$.

3. Prove that any common factor of A and B is also a factor of $nA \pm mB$; and find the H.C.F. of $a^3 + 2a^2b + 4ab^2 + 8b^3$ and $2a^3 + 9a^2b + 12ab^2 + 4b^3$.

4. Simplify—

(1.) $$\frac{x+\sqrt{x^2-a^2}}{x-\sqrt{x^2-a^2}} + \frac{x-\sqrt{a^2-x^2}}{x+\sqrt{a^2-x^2}}.$$

(2.) $$\frac{\frac{1}{(x+1)(x+2)(x+3)} - \frac{1}{(x+1)(x+2)} + \frac{2}{(x+1)(x+3)}}{\frac{1}{x(x+1)(x-1)} - \frac{1}{x(x-1)} + \frac{2}{x^2-1}}.$$

5. Solve the equations—

(1.) $\sqrt{x^2+ax} + \sqrt{a^2+ax} = x + a$.

(2.) $$\begin{cases} \frac{3}{8x} - \frac{7}{2y} = 1. \\ \frac{1}{16x} - \frac{11}{12y} = \frac{1}{4}. \end{cases}$$

(3.) $$\begin{cases} x^2 - 3xy = 4. \\ y^2 + 5xy = 21. \end{cases}$$

6. Find the square root of—

$$\frac{4x^4}{y^2} - 12x^3 + 9x^2y^2 - 8xy + 12y^3 + \frac{4y^4}{x^2}.$$

7. Prove that a ratio of lesser inequality is increased by adding the same quantity to both terms. What quantity must be added to each term of the ratio 5 : 91 in order to make its value four times as great?

8. Establish the formula for finding the sum of n terms in an arithmetical progression.

9. If $\frac{a}{b} = \frac{c}{d}$, prove that $\frac{la+mb}{lc+md} = \frac{a}{c}$; and if $x : y :: a : a+b$, prove that $x^2 - xy + y^2 : a^2 + ab + b^2 :: x^2 : a^2$.

10. A man is driving to a certain town. There are two roads by which he can go, one of which is 2 miles longer than the other. If he travels along the longer road at 10 miles an hour, he will take 3 minutes less than if he goes by the shorter at 8 miles an hour. Find the length of the roads.

11. Prove that the geometrical mean between two positive numbers is less than the arithmetical mean, except in one case.

12. A number (n) is divided into three parts such that one-third of the number exceeds the first part by as much as the second part exceeds one-fourth of the number. Find the third part.

Mensuration.

1. The two adjacent sides of a square containing 169 square feet are also diameters of circles. Find the area which is common to the two circles.

2. An engine, with a driving wheel 8 feet high, is running on a curve of 80 chains extreme radius: how many revolutions will the outer wheel make in running round a quadrant of the curve? If the rails are 7 feet apart, how many less will the inner wheel make?

Men (second year).

(Three hours allowed. Answer seven questions in Algebra and one in Mensuration.)

1. If $f(x)$ be an expression involving rational and integral powers of x that vanishes when x is substituted for a, prove that $x - a$ is a factor of $f(x)$.

Hence, or otherwise, prove that $(x+y)$, $(y+z)$, and $(z+x)$ are factors of $x^3(y+z) + y^3(z+x) + z^3(x+y) + 2(xy+yz+zx)^2$.

2. Determine the relation that must exist between p and q in order that one root of the equation $x^2 + px + q = 0$ may be n times the other.

3. Solve the equations—

(1.) $$\frac{x-b}{x-4b} + \frac{x+2a}{4(a-b)} = 1.$$

(2.) $$6\sqrt{\frac{x}{x+2}} - \sqrt{\frac{x+2}{x}} = 1.$$

(3.) $$y(x+5y) = 2x(7x-y) = 1.$$

4. Sum the series $1.2 + 2.3 + 3.4 + \ldots + n(n+1)$.

5. Give the algebraical definition of proportion and also Euclid's, and state what kind of quantities are included in the latter to which the former does not apply. Prove that if $a : b :: c : d$, then $(ab+c)^2 : (b^2+d)^2 :: e\sqrt{a^2+c^2} : d\sqrt{b^2+d^2}$.

6. Find two quantities, x, y, such that a, x, y and x, y, b are in H.P.

If $b+c$, $c+a$, and $a+b$ are in H.P., prove that a^2, b^2, c^2 are in A.P. Is the converse true?

7. Find three terms in G.P. such that their product is a^3 and their sum is b.

8. How many different arrangements can be made of n things of which p are alike?

A signalman has a red and a green flag; with each he can make six signals by holding it in three distinct positions, first in the right hand, then in the left: how many different signals can he make by using the flags, first singly, then one in each hand?

9. What is the coefficient of x^r in the expansion of $(1+ax)(1+bx)(1+cx)\ldots$ to n factors?

Write down the form of this coefficient when $a=b=c=\ldots=1$, and also when $b=c=\ldots=1$, but a retains its value.

10. Define the logarithm of a number to a given base, and prove that the logarithm of the product of two numbers = the sum of the logarithms of the two numbers, and that the logarithm of the nth power of a number = n times the logarithm of the number.

Mensuration.

1. The regularly tapering mast of a ship is 50 feet high; at one end it is 60 inches and at the other 36 inches in circumference: find the number of cubic feet of wood.

2. A sphere 4½ inches in diameter is cut from a cube of 5-inch edges: find the quantity of wood which is cut away.

Euclid.

Men (first year).

(Three hours allowed. Answer seven questions.)

1. Prove that two sides of a triangle are together greater than the two lines drawn from any point within the triangle to the extremities of the base.

2. Construct a rectangle equal to a given square, and having the sum of its sides equal to a given straight line. What limitation is necessary here?

3. Prove that the straight line joining a given point within a circle to the centre is at right angles to the shortest chord that can be drawn through that point.

4. Prove that of all the triangles that can be drawn on a given base, and with a given vertical angle, the greatest is that of which the sides are equal.

5. The opposite sides and angles of a parallelogram are equal, and the diagonal bisects it.

6. If a right-angled triangle have one of its acute angles double of the other, then the hypotenuse is double of the shortest side.

7. Construct a triangle, having given one side an adjacent angle and the difference of the other two sides.

8. T is a point in the side QR of the equilateral triangle PQR. Prove that the squares on QT and TR are together less than the square on PT by the rectangle QT . TR.

9. If two straight lines cut one another in a circle, prove that the rectangles contained by their segments are equal.

Men (second year).

(Three hours allowed. Answer seven questions.)

1. A circle touches the base BC of the triangle ABC and the other two sides produced. Prove that the tangent to it from A is equal to half the perimeter of the triangle.

2. Inscribe a circle in a given triangle. If a new triangle be cut off by a line parallel to the base, and passing through the centre of the inscribed circle, the perimeter of this triangle will be equal to the sum of the two sides of the first triangle.

3. The base of a triangle is given, and its middle point is the centre of a fixed circle, on the circumference of which the vertex of the triangle lies. Show that the sum of the squares on the two sides of the triangle is invariable.

4. If the ratio of two sides of one triangle be equal to the ratio of two sides of another triangle, and if the angles contained by these sides be equal, the triangles are similar.

5. If two circles touch one another externally, show that their common tangent is a mean proportional between their diameters.

6. Prove that it is possible to find one point, and one only, in a given line AB, which shall divide it in a given ratio.

7. If two circles intersect in P and Q, and through P a straight line be drawn cutting the circles in X and Y, show that the locus of the middle point of XY is a circle.

8. Divide a given triangle into two parts having a given ratio, by drawing a straight line parallel to its base.

With next month's issue we shall begin our Certificate Course for 1901.

LONDON MATRICULATION.

JUNE 1900.

BY R. C. B. KERIN, B.A. (LOND.),

First in First Class Classical Honours at Final; Principal, Carlyon College, 55 Chancery Lane, W.C.

LATIN COURSE FOR JUNE.

CÆSAR: TEST QUESTIONS.

Test I.

1. Draw a map of a Roman camp.
2. What provinces had the Romans at the time of the Gallic Wars?
3. With what object were the *Commentaries* written?
4. Briefly sketch the events narrated in the *Commentaries*.
5. What causes led Cæsar to invade Britain?
6. What notices of Britain have we in other ancient writers?
7. Give a brief account of the Roman army at this time.
8. What inaccuracies are there in Cæsar's account of Britain?
9. Where did Cæsar land?
10. What were the capitals of the following tribes (give the modern names):—Menapii, Atrebates, Morini, Treveri, Remi?
11. Draw a map of Britain, showing the position of the tribes mentioned.
12. Who were Cassivelaunus, Mandubratius, Commius, Meldi, Labienus, Cotta?
13. Describe the methods of fighting of the ancient Britons.

Test II.

Give the meaning of (marking the quantities of the vowels):—solvere, vigilia, laborare, commeatus, temo, essedis, orbem facere, supplicatio, conventus, annotinus, arbiter, litem aestimare, de injuriis satisfacere, in officio esse, civitati consulere, res novae, fidem alicui interponere, corus, dare operam, pro tempore, leni Africo, vectoriis, sui commodi facere, testudo, tripertito, funes, taleis, ad certum pondus examinatum pro nummo, materia, fagus, abies, septentriones, bruma, ex aqua mensuris, vitro, conferti, sicubi, se colligere, vectigal, fundis, tormentis, vadis, scaphas, armamentis, in stationem succedere, hiemi navigationem non subiciendam existimavit, actuariae.

Test III.

1. Parse:—delituerant, pateretur, consuerat, questus, adisset, auderet.
2. Write notes on:—Meldi, Pirustae, Aedui, Mona, Arduenna, Portus Itius, Veneticum bellum.
3. Turn into *oratio recta* or *obliqua* (as may be necessary):—Book IV., chap. xxi.—obsides.....temperare: quas possit..... venturum; xxv.—Desilite.....praestitero; xxvi.—obsides..... sese; xxxiii.—Genus.....habeant. Book V., chap. iii.—se suosque.....gererentur: sese idcirco.....permissurum; vi.—sibi a .....deferri: non sine causâ.....necaret; vii.—si vim.....neglexisset; x.—superiore.....acceptum; xx.—sese ei.....obtineat; xiv.—Ex his.....vestiti.

Test IV.

Write notes on:—primi pili, legatus, tribunus militum, legio.

Write a short life of Cæsar, and show the influence of these campaigns on his after-policy.

Write notes on the following passages dealing especially with case and mood usages:—

1. Tamen magno sibi usui fore arbitrabatur, si modo insulam adisset.
2. Illo adit.
3. Neque qui essent ad maiorum navium multitudinem idonei portus, reperire poterat.
4. Legati veniunt, qui polliceantur obsides dare.
5. Cuiusque auctoritas in his regionibus magni habebatur.
6. Huic imperat, quas possit, adeat civitates.
7. Volusenus perspectis regionibus omnibus, quantum ei facultatis dari potuit, qui navi egredi ac se barbaris committere non auderet, quinto die ad Cæsarem revertitur.
8. Magnum eis numerum obsidum imperat.
9. Quod praeterea navium longarum habebat, quaestori, legatis praefectisque distribuit.
10. Ducendum dedit.
11. Dum reliquae naves eo convenirent, ad horam nonam in ancoris exspectavit.
12. Atque alius alia ex navi, quibuscumque signis occurrerat, se aggregabat.
13. Post diem quartum, quam est in Britanniam ventum.
14. Quae est propius solis occasum.
15. Dum ea geruntur.
16. Secutae sunt continuos complures dies tempestates, quae et nostros in castris continerent et hostem a pugna prohiberent.
17. Arbitros inter civitates dat, qui litem aestiment poenamque constituant.
18. Circiter sexcentas eius generis, cuius supra demonstravimus, naves et longas XXVIII. invenit instructas.
19. Quid fieri velit, ostendit.
20. Venerunt et de suis privatim rebus ab eo petere coeperunt, quoniam civitati consulere non possent.
21. Qui iam ante inimico in nos animo fuisset multo gravius hoc dolore exarsit.
22. Precibus petere contendit ut in Gallia relinqueretur, partim quod insuetus navigandi mare timeret, partim quod religionibus impediri sese diceret.
23. Coercendum atque deterrendum, quibuscumque rebus posset, Dumnorigem statuebat.
24. Amplius octingentae uno erant visae tempore.
25. Qui praesidio navibus essent.
26. Navibusque Quintum Atrium praefecit.
27. His aliquantum itineris progressis.
28. Labieno scribit, ut, quam plurimas posset, iis legionibus, quae sunt apud eum, naves instituat.
29. Ipse, etsi res erat multae operae ac laboris, tamen commodissimum esse statuit.
30. Quos natos in insula ipsi memoria proditum dicunt.
31. Neque multum a Gallica differunt consuetudine.
32. Neque sui colligendi neque consistendi aut ex essedis desiliendi facultatem dederunt.
33. Cum equitatus noster liberius praedandi vastandique causa se in agros eiecerat, omnibus viis semitisque essedarios ex silvis emittebat.
34. In civitatem mittat qui praesit imperiumque obtineat.
35. Neque multum aestatis superarat.
36. Quid in annos singulos vectigalis populo Romano Britannia penderet constituit.

Typical Sentences.

40. "No one knows why he went to Rome on September 21, 49 B.C."

Nemo scit cur Romam ante diem decimum Kalendas Octobres (-is) iverit anno urbis conditae septingentesimo quinto.

Notes.—(*a*) As we saw in last month's course, September in 49 B.C. had only 29 days. Therefore, September 21 is the (29 − 21 + 2) tenth day before the kalends of October. (*b*) The city of Rome was founded 753 B.C. Therefore, 49 B.C. is (753 − 49 + 1) the seven hundred and fifth year from the foundation of the city. (*c*) *Urbis conditae* literally means, of the "city founded." It is a characteristic Latin idiom to use a past participle and a noun where in English we use two nouns (compare Milton's *Paradise Lost*, which is equivalent to "The Losing of Paradise," *Paradise Regained*, etc.).

41. "Who ordered such soldiers as these not to attack the town of Syracuse before the general gave the word of command?"

Quis hos tales milites iussit non oppidum Syracusas oppugnare antequam imperator signum daret?

Notes.—(*a*) Verbs of ordering, as we have seen before, take generally the dative and *ut* and subjunctive. *Iubeo* and *veto*, however, take the accusative and infinitive. (*b*) *Daret* is in the subjunctive, because the sentence is in *oratio obliqua*. It forms part of what was said. (See last month's course.)

42. "It is said that he stopped in the beautiful city of Capua from April 8 to August 12 without informing his uncle of his misfortune."

Capuae in illa pulcherrima urbe ab ante diem sextum Idus Aprilis usque ad pridie Idus Augustas (Quintilis) mansisse nec avunculum de calamitate sua certiorem fecisse dicitur.

Notes.—(*a*) *A. d. vi. Id.....* is regarded as a stereotyped noun, and prepositions are used before it. The same remark applies to *pridie Idus Augustas*. (*b*) "Without" and a verbal noun are expressed (see previous sentences) by *nec*, and the same mood and tense as in the preceding clause, if the preceding clause is a positive one. (*c*) *Dicitur* is used personally—literally, "he is said to have remained." With *dicitur* and *videtur*, as we have mentioned before, the Latins avoided the impersonal construction.

43. "Who says that the boy could have played well on the lyre, if he had been taught by you?"

Quis dicit puerum fidibus bene ludere potuisse si a te doctus esset?

Notes—(*a*) "Could have" and an infinitive are expressed by the perfect tense of *possum* and the present infinitive. Be careful not to use the perfect infinitive after verbs like *possum*, *debeo*, and *oportet*. We have explained the reason in our first sets of

typical sentences, but the mistake is such a common one that students require repeated warnings. (*b*) *Fidibus* is the ablative. (*c*) The subjunctive *doctus esset* is used because the past tense of *possum*, which forms the apodosis, is equivalent to a subjunctive. By the well-known rule already stated, the subjunctive is used in the protasis or "if" clause, if the subjunctive or its equivalent is used in the principal clause. Here *potuisse*, though in the infinitive, is equivalent to a subjunctive, as the infinitive is used because *dicit* requires one. (*d*) Once more a note of warning with regard to the preposition "by." If it is used with the agent, use *a* or *ab* with the ablative in Latin. If it is used with the instrument, in Latin the simple ablative is used without any preposition. If, however, "by" and the agent are used with the gerundive, the dative is used in Latin.

44. "He is afraid that he has been rather foolish in trusting in Marcus' treacherous mother."

Timet ne stultior sit qui Marci matri feminae perfidae confisus sit.

Notes.—(*a*) Note again the construction required by verbs of fearing. (*b*) The comparative often expresses that a person possesses a quality in *too high* a degree—as, *senectus loquacior est*, "old age is too talkative." In this sentence we translate "rather foolish" by *stultior*. (*c*) "In trusting" = "since he trusted." This is neatly turned by *qui* and the subjunctive (*qui* = *cum is*): the subjunctive normally follows *qui* used in a causal sense. (*d*) *Confido* usually followed by dative of the person in whom confidence is placed.

45. "I wish that your friend had been put to death before he had given way to anger and plundered the city."

Utinam amicus tuus interfectus esset antequam irae indulsisset et urbem spoliavisset.

Note.—(*a*) An impossible wish is expressed by *utinam* and the pluperfect subjunctive.

46. "I shall not answer till you are silent."

Non respondebo donec taceas (*tacueris*).

Notes.—The subjunctive can be used here with *donec*, as there is a notion of purpose or result; or you can use the future perfect indicative, *not* the present indicative. "You are silent" is equivalent to "you shall have been silent."

47. "Balbus is not the kind of man to spare the foolish Dolabella."

Balbus non is est qui Dolabellae homini stulto parcat.

Notes.—(*a*) Note that *is.....qui* with subjunctive expresses "just the man to;" *is.....qui parcit* means, "is the *man who spares*." (*b*) *Qui* in the sentence above = "such as who;" the subjunctive is *generic* or *descriptive*. (*c*) Note that *homo* must be inserted.

48. "When Hannibal fell severely wounded by a javelin in the thigh, the panic that seized his soldiers was so great that the town was all but abandoned."

Cum Hannibal femore pilo graviter vulnerato cecidisset tantus terror suos invasit ut haud multum abesset quin oppidum desereretur.

Notes.—(*a*) *Cum* with a past tense, if "since" or "although" can be substituted for it, requires in Latin the subjunctive; hence *cecidisset*. (*b*) "All but" is generally translated by *haud multum abesse quin*—literally, "it was not far absent but that." (*c*) *Ut*, meaning "so that," requires the subjunctive. (*d*) *Femore vulnerato*, ablative absolute. (*e*) *Pilo*, ablative of instrument.

QUERY COLUMN.

RULES.

1. Each correspondent is restricted to *one* question.
2. Each query must be accompanied by the name and address of the correspondent, and the *coupon* which appears on the back wrapper of the current number of the Journal.
3. CORRESPONDENTS MUST IN ALL CASES STATE THE SOURCE FROM WHICH THEIR QUERY HAS BEEN OBTAINED.

The Editor reserves to himself the right to decline to answer any question which is, in his judgment, unsuited to the Magazine.

Français.—Cassell's *French Dictionary* is by far the best. It is accurate, complete, and in every sense reliable.

London Matriculation.—The set book for June 1901 is *Catiline* (Sallust). There is an excellent edition for students published by the U.C.C. Press (W. B. Clive and Co.), edited by Neatby and Hayes. It contains a good historical introduction, text, notes (interleaved with notepaper), test papers, vocabulary, translation, and an index of proper names. Cassell's *Latin-English and English-Latin Dictionary* (Marchant and Charles) may be recommended. J. Finn's *Junior Euclid*, Books I. and II. (Clarendon Press), is a thoroughly practical manual for beginners, price 1s. 6d.

Nemo.—Given two straight lines M, N, and two points A, B between them: find a point C on M, and D on N, such that the sum of the straight lines AC, CD, DB may be a minimum.

(Deighton's *Euclid*, Book I.)

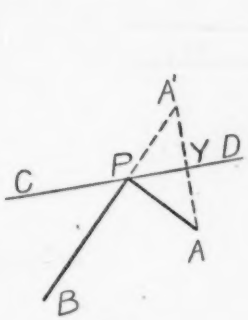


FIG. 1.

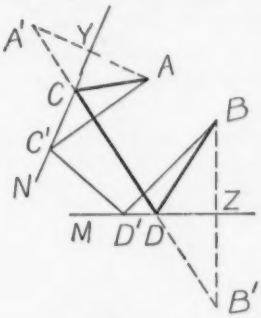


FIG. 2.

Let there be a fixed line CD (Fig. 1), and any two fixed points A and B not in CD; then, if AA′ be drawn perpendicular to CD, and A′B be drawn cutting CD in P, we shall *assume* that you can prove the well-known fact that the sum of AP and PB is less than that of any other two lines drawn from A and B to intersect on CD; also that AP and BP are equally inclined to CD.

Taking the given lines N and M and the points A and B, draw AA′ and BB′ perpendicular to N and M, making AY = YA′ and BZ = ZB′. Join A′B′, cutting lines N and M at C and D; then will AC + CD + DB be a minimum, DC and CA will be equally inclined to N, and DC and DB equally inclined to M.

For, draw any zigzag line AC′D′B; then, so long as D′C′ and C′A are *not* equally inclined to N, there can be drawn two lines from D′ and A to meet on line N so that their sum is *less* than that of D′C′ and C′A.

In exactly the same way, no matter where C′ is on N, so long as C′D′ and D′B are *not* equally inclined to the line M, there can be drawn two lines from C′ and B meeting on the line M so that their sum is less than that of C′D′ and D′B.

Hence the zigzag line ACDB will be shortest when DC and CA are equally inclined to the line N and CD and DB equally inclined to the line M.

This happens when C and D are found as we have directed above.

Thomas Barclay.—Three men run a race, and odds are offered against them of 2 to 1, 3 to 1, and 4 to 1 respectively. How much should a person lay upon them respectively so as to win £3, 5s. in every event?

(London Matriculation Examination, January 1896.)

Let the three men be A, B, C.

If a person P offers 2 to 1 *against* A winning, and another person Q accepts this offer and puts down £1—that is, lays £1 upon A—then, in the event of A winning, Q will receive £2 from P, and in the event of A losing, P will receive £1 from Q.

Let the amounts laid on A, B, C be x, y, and z in pounds respectively.

If A wins, the gain thereby is £$2x$; but since B and C lose, the loss thereby is £y and £z. Hence the *total* gain will be $2x - y - z$.

Therefore (1), $2x - y - z = 3\frac{1}{4}$, if A wins.

Similarly (2), $-x + 3y - z = 3\frac{1}{4}$, if B wins;

(3), $-x - y + 4z = 3\frac{1}{4}$, if C wins.

Adding (1), (2), (3), $y + 2z = 9\frac{3}{4}$ . . . . . (4)

(2) − (3), $4y - 5z = 0$, or $y = \frac{5}{4}z$ . . . (5)

$\therefore$ from (4), $\frac{13}{4}z + 2z = 9\frac{3}{4}$,

$\frac{13}{4}z = \frac{13}{4}$.

$\therefore z = 3$.

$\therefore$ from (5), $y = \frac{5}{4} \times 3 = 3\frac{3}{4}$.

$\therefore$ from (1), $x = 5$.

Ans. £5, £3¾, £3.

Timothy.—A perpendicular AD is drawn from the point A to the opposite side BC of any triangle ABC. Show that its length is the harmonic mean between the lengths of the radii of the escribed circles which touch AB and AC not produced.

(*Practical Teacher*, April 1897, p. 605.)

AD = $c \sin B$.

The harmonic mean between r_b and r_c is

$$\frac{2r_br_c}{(r_b + r_c)}$$

$$= 2 \cdot \frac{\frac{S}{s-b} \cdot \frac{S}{s-c}}{\left(\frac{S}{s-b} + \frac{S}{s-c}\right)} = \frac{2S^2}{\frac{S(s-c+s-b)}{(s-b)(s-c)}}$$

$$= \frac{2S}{(2s-b-c)} = \frac{2S}{a}.$$

Now $c \sin B = c2 \sin \frac{B}{2} \cos \frac{B}{2}$

$$= 2c \sqrt{\frac{(s-a)(s-c)}{ac} \cdot \frac{s(s-b)}{ac}}$$

$$= \frac{2c}{ac} S$$

$$= \frac{2S}{a}. \quad (Q.E.D.)$$

——.—Find for what values of c the expression

$$x^4 - 4x^3 + cx^2 + c^2x - 3$$

is divisible by $(x - 3)$ without a remainder.

(Second Stage, 1895.)

Divide by $x - 3$, and find out what c must be.

$$x - 3)x^4 - 4x^3 + cx^2 + c^2x - 3(x^3 - x^2 + (c-3)x$$

$$x^4 - 3x^3$$

$$- x^3 + cx^2$$

$$- x^3 + 3x^2$$

$$(c-3)x^2 + c^2x$$

$$(c-3)x^2 - 3(c-3)x$$

$$(c^2 + 3c - 9)x - 3.$$

The remainder and divisor are now of the same form—each contains a term in x and a constant. The constants are alike, therefore the terms in x *must* be alike if there is to be no remainder finally.

Hence $c^2 + 3c - 9 = 1$.

$c^2 + 3c - 10 = 0$.

$(c + 5)(c - 2) = 0$.

$\therefore c = -5$ or 2. Ans. $\underline{-5 \text{ or } 2}$.

Mark.—Simplify—

$$(a+b+c)^4 - 4(a+b+c)^2(bc+ca+ab) + 2(bc+ca+ab)^2 + 4abc(a+b+c).$$

(Inter. Science, 1886.)

a^4 will never occur without b^4 and c^4;

a^3b will never occur without b^3a, b^3c, a^3c, etc.;

a^2bc will never occur without b^2ac, c^2ab; and so on.

Therefore, in order to shorten the work, let

Σa^4 mean the sum of $a^4 + b^4 + c^4$;

Σa^3b mean the sum of $a^3b + b^3a + a^3c$, etc.;

Σa^2bc mean the sum of $a^2bc + ab^2c + abc^2$; and so on.

Now $(a+b+c)^4 = \Sigma a^4 + 4\Sigma a^3b + 12\Sigma a^2bc + 6\Sigma a^2b^2$

$-4(a+b+c)^2(ab+ac+bc) = -4(\Sigma a^2 + 2\Sigma ab)(\Sigma ab)$

$= -4(\Sigma a^2 \cdot \Sigma ab) - 8(\Sigma ab)^2$

$= -4(\Sigma a^3b + \Sigma a^2bc) - 8(\Sigma a^2b^2 + 2\Sigma a^2bc)$

$= -4\Sigma a^3b - 20\Sigma a^2bc - 8\Sigma a^2b^2$.

$2(bc+ca+ab)^2 = 2(\Sigma a^2b^2 + 2\Sigma a^2bc)$.

$4abc(a+b+c) = 4\Sigma a^2bc$.

$\therefore$ adding up on both sides, we obtain given expression

$= \Sigma a^4 = a^4 + b^4 + c^4$.

Rutherford.—From a point P tangents PA and PB are drawn to a circle ABC. DCE is any other tangent meeting PA and PB in D and E. Prove that perimeter of triangle PDE is constant whatever may be the position of the point C.

(Lang's *Euclid*, Book III.)

(Please supply the figure.)

Perimeter = PD + DC + CE + EP

= PD + DA + BE + EP

= PA + PB

= constant.

W. Duckett.—A man lends in two separate sums £1500 at the same rate of interest. The first, with interest, is repaid at the end of eight months, and its amount is £936. The second sum, with interest, is repaid at the end of 10 months, and its amount is £630. Find the separate sums lent and the rate of interest.

Let x = one sum, then $1500 - x$ = other sum.

Let r = rate per cent.

Then $x + \frac{r}{100} \cdot x \cdot \frac{8}{12} = 936$.

Or $x\left(1 + \frac{r}{150}\right) = 936$ . . . . . (1)

Also, $(1500 - x) + \frac{r}{100}(1500 - x) \cdot \frac{10}{12} = 630$.

Or, $(1500 - x)\left(1 + \frac{r}{120}\right) = 630$ . . . . (2)

(1) becomes $1 + \frac{r}{150} = \frac{936}{x}$.

$$\frac{r}{150} = \frac{936}{x} - 1. \quad . \quad . \quad . \quad . \quad . \quad (3)$$

$$\frac{r}{120} = \left(\frac{936}{x} - 1\right)\frac{150}{120}.$$

(2) now becomes $(1500 - x)\left(1 + \frac{936 - x}{x} \cdot \frac{15}{12}\right) = 630$.

$$(1500 - x)\frac{(4x + 4680 - 5x)}{4x} = 630.$$

$(1500 - x)(4680 - x) = 2520x$.

$x^2 - 8700x + 1500 \times 4680 = 0$.

$x^2 - 8700x + 900 \times 7800 = 0$.

$(x - 900)(x - 7800) = 0$.

$\therefore x = 900$ or 7800, the latter of which is impossible.

Hence one part is £900 and the other £600.

From (3),

$$\frac{r}{150} = \frac{936}{900} - 1 = \frac{36}{900}.$$

$$r = 150 \times \frac{36}{900} = 6.$$

Ans. $\underline{\text{£900, £600, and 6 per cent.}}$

Egremont.—Given that

$$y^2 + z^2 + yz = a^2, \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

$$z^2 + x^2 + xz = b^2, \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (2)$$

$$x^2 + y^2 + xy = c^2, \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (3)$$

find an expression for $xy + xz + yz$ in terms of a, b, c.

(London B.Sc. Pass Examination, 1899.)

To shorten the work, we have used the "Σ" notation as explained in the solution to the query under the head of "Mark" in the Query Column for this month.

(1) + (2) + (3) gives $2\Sigma x^2 + \Sigma xy = \Sigma a^2$ . . . . . (4)

Adding $3\Sigma xy$ to each, $2(\Sigma x)^2 = \Sigma a^2 + 3\Sigma xy$ . . . . (4*a*)

(1) − (2) gives $(y - x)\Sigma x = a^2 - b^2$ . . . . . (5)

(2) − (3) gives $(z - y)\Sigma x = b^2 - c^2$ . . . . . (6)

(3) − (1) gives $(x - z)\Sigma x = c^2 - a^2$ . . . . . (7)

(5) × (6) gives $(yz - xz + xy - y^2)(\Sigma x)^2 = (a^2 - b^2)(b^2 - c^2)$. (8)

(6) × (7) gives $(yz + xz - xy - z^2)(\Sigma x)^2 = (b^2 - c^2)(c^2 - a^2)$. (9)

(7) × (5) gives $(-yz + xz + xy - x^2)(\Sigma x)^2 = (c^2 - a^2)(a^2 - b^2)$ (10)

(8) + (9) + (10) gives $[\Sigma xy - \Sigma x^2](\Sigma x)^2 = \Sigma a^2b^2 - \Sigma a^4$. (11)

Substituting in (11) from (4) and (4*a*) the values of $(\Sigma x)^2$ and Σx^2 in terms of Σxy, we obtain, on transposing and simplifying, $3(\Sigma xy)^2 = 2\Sigma a^2b^2 - \Sigma a^4$.

Or $3(xy + xz + yz)^2 = 2(a^2b^2 + a^2c^2 + b^2c^2) - (a^4 + b^4 + c^4)$.

Aberdonian.—A man derives his income from investments. Each year he invests *half* of it at $3\frac{1}{2}$ per cent., and meets all charges (including income-tax) from the other half. Find to the nearest penny the amount of income-tax at 8d. in the £1 which he will pay in A.D. 1900 if his income in A.D. 1898 was £1500.

(Girl and Women Clerks' Paper.)

We understand this to mean that the man has a certain amount of money invested. In 1898 the interest on this was £1500. So long as he did not invest more money his annual income would always be £1500. But during 1899 an additional £750—that is, $\frac{1}{2}$ of £1500—was invested, and this would bring in $\frac{3\frac{1}{2}}{100}$ of 750, or $3\frac{1}{2} \times 7\frac{1}{2}$, or £26$\frac{1}{4}$. Hence his income for 1899 was £1526$\frac{1}{4}$, and so long as he did not invest more money in 1900, his income for that year would be also £1526$\frac{1}{4}$. But if he invests £763$\frac{1}{8}$ in 1900, this will bring in an additional income of $\frac{3\frac{1}{2}}{100}$ of £763$\frac{1}{8}$, which is $\frac{3\frac{1}{2}}{100}$ of £763·125, or 3·5 × £7·63125, or £26·709, or £26. 14s. 2d., to the nearest penny. Hence his income for 1900 is £1526$\frac{1}{4}$ + £26, 14s. 2d., or £1526, 19s. 2d. The income-tax on this is $\frac{8}{240}$ of £1526·958, or £50·8986, or £50, 18s., to the nearest penny.

Rex.—Solution by post.

OUR SCIENCE SECTION

☞ **Subscribers requiring Explanations of Difficulties in any branch of Science, or Advice upon Courses of Study, can obtain all help required by communicating with the Editor, and accompanying their query with the Coupon cut from this Number.**

BOARD OF EDUCATION,
SOUTH KENSINGTON, LONDON, S.W.

THE SCIENCE AND ART DIRECTORY.

THE Science and Art Directory for the session 1900–1901 will be published at an early date, but in order to facilitate the arrangements which managers of schools may have in contemplation, the subjoined list of some of the more important changes has been prepared.

(*The references to pages and paragraphs are to those in the Directory revised to July 1899.*)

Page 8, sec. xiv.—Classes meeting after *1 p.m.* on Saturdays are accepted as evening classes.

Page 9, sec. xiv. *d.*—The inspector is empowered to sanction concurrent instruction, and applications for such sanction are to be addressed to him.

Page 10, sec. xv.—The keeping of a general register on Form 486 will not be insisted on, but a record of students joining classes will be required.

Page 13, sec. xviii. *g* (Science) and *d* (Art).—The conditions under which students may be registered in Advanced Stage of Science Subjects, or Groups II., III., and IV. of Art, are modified as follows:—

SCIENCE.

No student may be registered in the advanced stage of a subject unless he has made twenty attendances in a previous year in the elementary stage of the same subject, or has obtained a success in that stage, or gives satisfactory evidence to the Board of his ability to profit by such advanced instruction.

ART.

Registration of a student's attendances for instruction in Groups II., III., and IV. will be accepted, provided he is qualified by success at the examinations or is recommended by the inspector.

Provisional registration in the advanced stage of subjects of Science is no longer allowed.

Page 13, sec. xviii. *h.*—Where a pupil teacher receives practical as well as theoretical instruction in Section 1 of the Elementary Stage of Subject XXIII., he may be registered for attendances at such instruction for two years.

For the examinations in Drawing Ornament in Outline, casts instead of diagrams will be supplied, on certain conditions.

Page 16, sec. xxi. *a* (Art).—Practical work in Modelling (Subject 18*a*) will be tested by the inspector when he visits the class. Arrangements are made for holding local examinations in Drawing with Chalk on the Blackboard.

Page 25, sec. xxxix. *d.*—The minimum number of attendances qualifying for a grant is raised to fourteen (or, where lessons of less than one hour have been sanctioned, to twenty).

Page 30, sec. xliv. *h.*—The restrictions on payments for engineer students and dockyard apprentices are revised.

Page 26, sec. xl.—The assessment of the grant in the elementary stage will be wholly based on the inspector's report. Gratuitous admission to examinations in the elementary stage is abolished.

Page 31, sec. xlv. *c.*—Previous registered attendance in the elementary or the advanced stage of a subject of Science is made a condition of payment for honours in that subject.

Page 33, sec. xlviii. *a.*—Certificates of success will be issued to all successful candidates. Certificates of *attendance* in the elementary stage of a subject of Science, or Group I., Art, will be supplied to managers making application as prescribed.

SCHOOLS OF SCIENCE.

Page 48, sec. lviii.—The laboratories in a School of Science are to be available for preparation work by students of the school beyond the school hours of the time-table.

Page 49, sec. lx.—Laundry work is added as manual instruction for women.

Page 51, sec. lxii.—Courses for Schools of Science in rural districts are added.

Page 56, sec. lxviii. *c.*—Managers are allowed the option of having the grant for Practical Chemistry in the advanced course assessed by the inspector or on the results of examination in the advanced stage.

The syllabuses in Subjects I., Practical Mathematics, and XIII. are altered. The syllabus in Practical Mathematics includes an advanced stage.

STAR STUDY
FOR SCHOLARSHIP STUDENTS.

VII.—JUNE.

THE constellations with which the student is already familiar will this month be found as follows:—

In the **Zenith**, Ursa Major and Boötes, the bright particular star of which—namely, Arcturus—will be found in the south.

The **North** shines with Ursa Minor, Cepheus, and Cassiopeia; whilst Cygnus (the Swan), with which we become acquainted for the first time this month, will be found in the north-east.

The **East** displays the two zodiacal asterisms Sagittarius and Scorpio, which we have not yet had opportunity to study, and Aquila, also fresh to us, together with Lyra, Corona, and Ophiuchus—the last named lying to the south.

The **South** is bright with Virgo, Libra, and Corvus.

In the **West** will be found Leo, Cancer, and Gemini; whilst Capella, the cynosure of Auriga, lies to the north of west.

Cygnus is a pretty constellation close to Vega—the bright star in Lyra—on the left. The upper part of the asterism is shaped like a half-wheel. It consists of five stars of the second and third magnitude, arranged somewhat in the shape of a Latin cross. To the right of Cygnus is the great square of Pegasus. The constellation is visible from May to December.

Sagittarius, the ninth sign of the zodiac, is not seen well until July. It never rises far above the horizon, and is obscured by the long twilight of summer evenings. A line drawn from the left arm of the cross of Cygnus to the star over Altair—a bright star in Aquila, of which we shall speak later—leads to the brightest star of the constellation, which is called Venus Australis.

Scorpio, the eighth sign of the zodiac, is situated directly below Ophiuchus. A line drawn at right angles to another line joining Altair and his two companions will lead to the first-magnitude star **Antares**—so called because it rivals Mars in brightness—the heart of the scorpion, below which the tail sweeps round in a curve. The three stars to the right of Antares are the head of the scorpion. The lower stars of Scorpio do not rise above the horizon in Britain, and the constellation is visible only in June and July.

Aquila.—Some distance below Vega, and a little to the left, lie three stars in a line, the middle one of which is the magnificent first-magnitude star Altair, of which we have already spoken. In addition to these, there are several other stars of the third magnitude belonging to the constellation Aquila. Altair should be carefully located, as it is very useful in finding the summer constellations.

The Planets.—**Venus** is still an evening star, and is situated in Gemini. She should be very carefully noticed on the 1st, as she is then at her brightest.

Mars is in Aries. A favourable time to view the fiery planet is about two hours before sunrise.

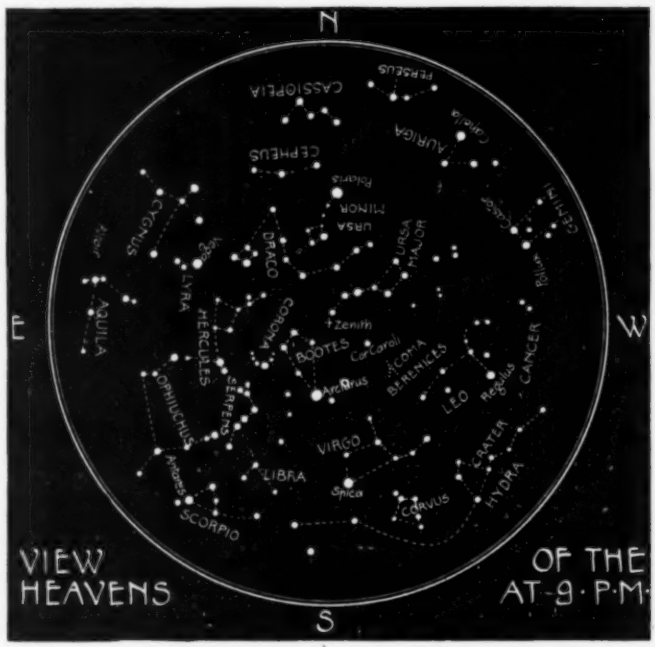
Jupiter is an evening star in Scorpio. On the 11th he approaches the moon.

Mercury is in Gemini, and is best situated for observation on the 13th; but, as previously stated, it is not an easy thing to see this planet, on account of its proximity to the sun.

Saturn is in Sagittarius, and is visible from sunset to sunrise. On the 23rd he is in opposition to the sun. On the 13th Saturn is occulted by the moon, the occultation beginning at 9.40 and terminating at 10.52 p.m.

The **Moon** is in apogee on the 5th and in perigee on the 19th. On the 13th there is a partial eclipse of the moon, which is partly visible throughout the British Isles. The shadow of the earth comes into contact with the moon at 1.16, and finally leaves the opposite limb of our satellite at 5.39.

On the 21st of the month we have the **summer solstice**, when there is practically no night in Great Britain. It will be well for the student to make quite sure that he understands the phenomena of lunar eclipses, especially in reference to why there is not an eclipse each time the earth comes between the moon and the sun. It will also be appropriate to do the same with respect to the solstices. In particular, it should be perfectly clear to him why the sun is said to stand still (*sol*, sun; *sto*, I stand) over the tropic of Cancer. The fact that the sun is never vertical to the north of the tropic of Cancer or to the south of the tropic of Capricorn will have to be well understood, as also why the term tropic (*tropo*, I turn) is appropriate. If there is any doubt in his mind, he should consult Professor Gregory's *Elementary Physiography* (Nelsons).



STAR MAP NO. VII. (JUNE).

CHEMISTRY NOTES.

BY THOMAS CARTWRIGHT, B.A., B.SC. (LOND.),

First Class Honoursman in Chemistry.

Luteol, a New Indicator.—M. Paul Gloess strongly recommends this new indicator, for which we are indebted to Dr. Autenrieth, as being much more sensitive and reliable than the commonly-used indicators, such as litmus and phenolphthalein. The substance is oxychlordiphenyl-chinoxaline—$C_{12}H_{10}OHNCl$—and is a derivative of phenacetin, from which it is obtained by the agency of pentachloride of phosphorus.

Crystallised in alcohol, it occurs in fine needles with a pale yellow colour, melting at 246°, and sublimating at a higher temperature without decomposition. It is insoluble in water, difficultly soluble in cold alcohol, but easily so in warm, as it is also in ether. Completely insoluble in cold mineral acids, luteol easily dissolves in cold solutions of caustic soda, potash, and ammonia, or the alkaline carbonates, giving salts of a very pronounced yellow colouring power. An excess of acid completely decolourises these solutions, precipitating the luteol in the form of a whitish flocculent deposit.

Solutions of the indicator are prepared by dissolving 1 gram of luteol in 500 c.c. of alcohol. The flasks containing the solutions should be hermetically sealed, away from fumes of ammonia gas. As the colouring power is very pronounced, it suffices to use 5 drops for a titration; further, it is advisable to well dilute the liquid to be titrated.

Sulphur Perfluoride.—Now that fluorine may be prepared in the comparatively inexpensive copper apparatus, it is possible to get the gas in sufficient quantity to examine its properties. Moissan is studying the reactions of this most active of all the elements, and has recently isolated a new gaseous body—to wit, the perfluoride of sulphur, SF_6. The mode of preparation is as follows:—

Fluorine is passed over sulphur contained in a copper boat in an atmosphere of nitrogen, and the resulting gas, after having been cooled to − 80° C. by a mixture of solid carbon dioxide and acetone, becomes liquid. By allowing the liquid thus obtained to boil off at the ordinary temperature, a mixture of fluorides of sulphur is obtained partly absorbable by potash. The unabsorbed portion is sulphur perfluoride, which has peculiar properties for a fluoride. It is a colourless, odourless gas, so inert in its behaviour towards reagents as to be comparable with nitrogen. It is unacted upon by prolonged contact with potash, by fused potash and lead chromate, and has no effect whatever upon red-hot copper oxide. Phosphorus and arsenic can be distilled unaltered in sulphur perfluoride, and sodium can be melted in it without change, the temperature having to be raised above the boiling-point of the metal before reaction sets in. The density of the gas is 5·05 compared with air. The analysis of the compound was effected by decomposing it by the vapour of sodium at a red heat—a mixture of sodium sulphide and fluoride being thus obtained—and also by heating the sulphur perfluoride in glass vessels and measuring the volume of the silicon fluoride evolved. The results are in accordance with the formula SF_6, the hexavalent character of sulphur being thus clearly demonstrated.

Action of Hydrogen on Antimony Sulphide.—At temperatures above 360° hydrogen acts on crystallised antimony sulphide, yielding antimony and sulphuretted hydrogen. Upon the same conditions of temperature, sulphuretted hydrogen attacks antimony, forming the trisulphide Sb_2S_3. If the operations take place in sealed tubes, the two inverse reactions tend to a system of four bodies in chemical equilibrium. A study of this system leads to the conclusion that the limiting composition of the gaseous mixture depends only on the temperature.

Iodised Potassium and Ammonium Carnallites.—A mixture of a solution of 8 grams of KI and 200 grams of the salt MgI_26H_2O is submitted to slow evaporation *in vacuo* over H_2SO_4. The crystals dried below the folds of blotting-paper, and left over H_2SO_4, gave on analysis figures pointing to the formula $KIMgI_2+6H_2O$. The water was estimated by calcining the material with a large excess of oxide of lead.

Iodised carnallite occurs in flat prisms. The crystals are very hygroscopic, and they have a density of 2·547 at 15°. Their molecular volume is 217.

The iodised ammonium carnallite is obtained by the evaporation *in vacuo* over H_2SO_4 of a solution containing 15 grams of NH_4I and 125 grams of MgI_26H_2O. The analysis of the crystals leads to the formula $NH_4IMgI_2 + 6H_2O$.

In crystalline form and in properties the crystals resemble those of the iodised potassium compound.

The density of the crystals at 15° is 2·346, pointing to a molecular volume of 226.

Minerals containing the Rare Earths.—Baron Nordenskiöld supplies some valuable items under this head. The first mineral referred to is **scheelite**, and the next **cerite**, which contains no less than four rare metals. The incandescent light produced when the latter mineral is fused with charcoal powder was first observed by Cronstedt in 1751. The discovery of

glucina, lithia, selenium, and yttria is next referred to. Minerals containing yttria and oxides related to it were at one time thought to be almost limited to certain hæmatite veins running in a broad zone on both sides of the 60th parallel of latitude. Latterly, fluocerite, orthite, and gadolinite have been found in Dalecarlia; and among these minerals Benedicks discovered a silicate of yttrium yielding 1·5 per cent. of nitrogen and helium. The author discovered kainosite, a silico-carbonate of yttrium and calcium, among minerals from Hitterö; and the same mineral was subsequently discovered in the fissures and drusy cavities at the Nordmarten mines. Thorium, discovered by Berzelius in 1829, was originally obtained from the rich mineral locality of Langesund, but it has since been recorded from other localities. It is now obtained from the monazite sands of the rivers of Brazil and South Carolina. Thorite contains about ·5 per cent. of inactive gas, which is probably a mixture of nitrogen and helium; but the latter element was first obtained from the mineral cleveite, also containing thorium, discovered by Nordenskiöld in 1877. Fergusonite, one of the richest sources hitherto known for obtaining the mysterious mixture of gases of which argon and helium are constituents, was discovered by Giesecke in Greenland.

Radio-active Elements.—The work begun by M. Becquerel, in his discovery of radiation from uranium salts, is rapidly being extended. In addition to the radio-active elements **polonium** and **radium**, for the discovery of which the world of science is indebted to M. Curie and his wife, M. Debierac has discovered another element, having similar properties, belonging to the iron group. Like polonium and radium, it is extracted from pitch-blend residues, and has been given the name **actinium** by M. Debierac. No one of these three elements has as yet been completely isolated. The most that can at present be done is to concentrate the radio-active material in certain precipitates. The chemical reactions of actinium, as at present determined by spectrum analysis and other methods, point to the fact that the substance is an impure thorium, but it is certain that the radio-active effect produced is due neither to polonium nor to radium.

White and Grey Tin.—The discovery that tin can exist in two modifications—namely, white and grey—is due to Dr. Cohen, who found that the change from the white to the grey variety is exceedingly slow for the temperature interval from 10° to 20° C. So slow is the change that many years are needed to accomplish it—a fact that has recently received curious corroboration from the examination of a pewter vase of about the date 350 A.D., from the study of which it would appear that no less a period than fifteen hundred years is requisite for a complete change of the white into the grey variety at the temperatures named.

Nickel Arsenide—Ni_5As_2.—This compound has been prepared by MM. Albert Granger and Albert Didier, by passing a current of carbon dioxide mixed with the vapours of arsenic trichloride over heated reduced nickel. The analysis of the body thus formed corresponds with the formula Ni_5As_2.

Diphosphide of Tungsten.—This new compound has lately been prepared by M. Eduard Defacqz of Paris. Dry phosphine and tungsten hexachloride are heated to a temperature of 450° C., when the new body, the composition of which is represented by the formula WP_2, results. Starting from this diphosphide, M. Defacqz succeeded in forming another phosphide the composition of which is not yet known, a chlorophosphide, and a double phosphide.

NOTES ON ADVANCED AND HONOURS PHYSIOGRAPHY.

Physical Problems and their Astronomical Application.—Under this head, Sir Norman Lockyer gave an interesting address, before the Physical Society, on the work done at the Solar Physics Observatory, South Kensington, which cannot fail to be of interest and of profit to our readers.

The Chief Work.—This consists in the comparison of stellar spectra with spectra obtained from lights emitted from laboratory sources. The light from a star (or the sun) and from an arc (or a spark) are focussed alternately upon the slit of a spectroscope, and the two spectra are photographed side by side upon the same plate. The number of lines in the arc spectrum depends upon which part of the arc is focussed on the slit. The image of the centre is rich in lines; the image of the edge gives a few single lines.

Changes in Spectra.—The thickening and thinning of lines depends upon several things—in the first place, upon the density of the substance; and thus the hydrogen lines in the spectrum of Sirius are much broader than those in α Cygni, because the hydrogen is denser in the former star than in the latter. Changes are also produced by variations in quantity. A reduction in the quantity of a substance generally simplifies its spectrum, the longest line disappearing last.

Motion.—The motion of a luminous body to or from the spectroscope alters the wave-length of the light emitted, and produces a shift in the lines of the spectrum; and the amount of deviation is a measure of the velocity of approach. In the case of Nova Aurigæ, we have dark and bright lines of the same substance side by side. This shows that there are two bodies involved, moving with different velocities, the one giving a radiation and the other an absorption spectrum.

Temperature.—An increase in temperature produces a greater number of lines—a notable exception being sodium, which gives its full number of lines at the temperature of an ordinary Bunsen flame.

Difference between Arc and Spark Spectra.—The spectra obtained from the arc and by sparking are often quite different. Those lines which make their appearance, or are intensified, in passing from the arc to the higher temperature of the spark are known as enhanced lines. The comparison of stellar spectra with laboratory spectra is often very easy. For instance, the presence of iron in the sun and of hydrogen in Sirius is easily seen. Several lines in the spectrum of Bellatrix have been shown to be due to helium, the position of the lines being exactly the same as those due to the gases from cleveite. In many cases it is possible to build up the spectrum of a star from the spectra of its constituents taken at the proper temperature. For example, the spectrum of γ Orionis can be closely imitated by means of oxygen, nitrogen, and carbon, together with the well-marked lines of hydrogen and helium.

Stellar Thermometry.—We can roughly estimate, by the character of the spectra of stars, the temperature of those stars, and thus arrive at a stellar thermometry. Starting with a hot star like Bellatrix, and passing through β Persei, γ Lyræ, Sirius, Castor, Procyon, to Arcturus—a cold star—we have a gradual change in the character of the lines which appear in the spectrum of any constituent. The widening of the lines in the case of spectra of sun-spots enables us to trace changes in the temperature of the sun, and we can compare these temperature changes with a variety of terrestrial phenomena, such as variation in latitude. The extraordinary number of lines exhibited by many metals suggests that what we are accustomed to call chemical elements are really complex bodies, which are made up of simpler ones. Attempts have been made to build up the spectra of metals by superimposing sets of lines upon one another. In many cases a great number of series would be required to represent things completely. In the case of hydrogen it would be necessary to have at least twenty-seven series to give the structure series only. Taking the atomic weight of hydrogen as unity, the atomic weight of the little masses which might give rise to any one of the series would be about ·0019. This is the order of magnitude of the small bodies whose existence has been suggested by Professor J. J. Thomson, from his work on ions.

Giant Hailstones.—Mr. Deacon gives some interesting particulars of a remarkable fall of hail that occurred during a recent thunderstorm in Cape Colony, at Herbertsdale. In size the stones ranged from small marbles to small hens' eggs, very many of them being as large as turkeys' eggs. Some of them had a very peculiar shape, being round and spiked, and presenting the appearance of a bristly anemone, or of a hedgehog rolled up into a ball. The exceptional nature of the hailstones may be gathered from the fact that Mr. Deacon had seen nothing like them during a residence of thirty-seven years in South Africa.

The Propagation of Earthquake Motion.—Mr. Oldham has communicated to the Royal Society some very interesting facts on the above subject. He states that the complete record of an earthquake shows three distinct phases, differing both in character and in the amount of the displacement. The motion during the first two phases is principally of a to-and-fro nature, whereas in the third phase the movement is composed of long surface undulations resembling the swell of the ocean. In the first two phases, again, the surface velocity increases with the distance from the origin, and in accordance with the hypothesis that they consist of elastic waves propagated through the earth at rates which increase with the depth below the surface. If the time-curves from the beginnings of the first and second phases are continued to the origin, they give initial rates of propagation which agree fairly closely with the probable initial rates of propagation of condensational and distortional waves in continuous rock. Hence Mr. Oldham thinks that the first phase represents the arrival of condensational waves, and the second phase, of the distortional waves, both having travelled along brachistochronic paths through the earth. In the third phase,

the surface velocity appears to be constant at all distances from the origin, the inference being that they are propagated as surface undulations. The velocity is not, however, the same for all earthquakes, but increases with the intensity; and from this fact, and the high velocity in the case of great earthquakes, it seems probable that the propagation of these waves is, at least in part, gravitational.

Sigillaria.—M. Grand' Eury has recently concluded a study of the upright trunks, stems, and roots of Sigillaria, as disclosed in a quarry at St. Etienne. From the fact that the stems found in an upright position are not distributed at random, but are commonly found in groups near each other, forming well-defined colonies, and from other characters of their growth, M. Grand' Eury concludes that Schmidt's hypothesis, which regards Sigillaria as having been transported by water and deposited in position, is erroneous. Moreover, the view of Dawson, that they have grown upon submerged soil, is also shown to be irreconcilable with the discoveries made at St. Etienne. The author concludes that Sigillaria must have grown in the places wherein they are found, in a marshy soil, and under water varying in depth from one to seven or eight metres in exceptional cases.

Earthquake at Manchester.—A slight earthquake occurred at Manchester, at 1.17 a.m. on April 7. The shock was felt at Pendleton, Pendlebury, Sudley, Salford, and the surrounding neighbourhood of the Irwell Valley fault. The small disturbed area, and the rather marked intensity of the shock, point to a local origin, probably connected, directly or indirectly, with the extensive coal-workings of the district. A previous shock in the same vicinity was experienced on February 27, 1899.

British Earthquakes from 1893 to 1899.—Dr. C. Davison gives, in *The Geological Magazine* for March and April, a useful *résumé* of British earthquakes during the seven years above mentioned. The total number of shocks recorded during this period is forty-two—namely, twenty-eight in England and Wales, and fourteen in Scotland. The area in England most addicted to earthquake shocks is that comprised within the counties of Pembroke, Hereford, and Cornwall; in Scotland—Annandale, Glen Garry, and the neighbourhood of Comrie and Fort William. The earthquakes of the last-named region have an interest from their connection with the two great faults which bound the Highland district. The study of the shocks proves that the southern boundary fault, near Comrie, heads to the north-west, and the northern fault, near Fort William, probably to the south-east. A list of the spurious or doubtful earthquakes is given by Dr. Davison, and local earthquakes in mining districts are described, for which he suggests another cause besides that of rock-falls in old workings—namely, small fault slips in those places where the coal has been worked right up to the fault, and so withdrawn support from the rock above.

The Becquerel Rays.—The question as to the origin of the energy possessed by the Becquerel rays is one of considerable interest. The existence of substances capable of emitting radiations possessing energy, without any appreciable loss of weight or introduction of work from external sources, would appear to be impossible from the view of the conservation of energy. The measurements of M. Henri Becquerel upon the deviation of the radium rays in an electric field, taken in conjunction with those of M. and Mme. Curie of the charges carried by those rays, lead to results which show a way out of this difficulty, on account of the extreme minuteness of the quantities of energy in question. The calculations of M. Becquerel show that the radiation is of the order of one ten-millionth of a watt per second. Hence a loss of weight of about a milligram in a thousand million years would suffice to account for the observed effects, assuming the energy of the radium to be derived from an actual loss of material.

SCIENCE NOTES.

New Thermometers.—Betts has recently invented a milligrade thermometer in which mercury freezes at zero and boils at 1000 degrees, the scale being to Fahrenheit as 10 to 7. Minus degrees are abolished for all ordinary purposes. On the proposed scale, water boils at 360 degrees, the point of aqueous congelation is just above 100 degrees, and 200 degrees milligrade equals 100 degrees Fahrenheit. Another interesting thermometer is the quartz thermometer of A. Dufour. Boys had already shown that quartz is plastic in the flame of the oxyhydrogen blowpipe before melting. Dufour has constructed a thermometer for high temperatures, with a quartz bulb and stem. Tin is used for the liquid, because it is readily obtained pure, has a relatively low melting point, and is not appreciably volatile below a red heat. The thermometer is filled with molten tin by aspiration. When as perfect a vacuum as possible is obtained in the stem, it is sealed in the oxyhydrogen blowpipe. To get rid of the last few bubbles of air, the tin is melted, and the thermometer is given repeated shocks. If the tin should form a trace of oxide, this will collect in the bulb and will remain there. The meniscus in the stem is always very bright, resembling that of a mercury thermometer. The bulb must be thick, or the tin when it contracts will fracture it. Dufour suggests that tubes of quartz are likely to prove valuable for spectroscopic work, thus doing away with the difficulty of obtaining a pure spectrum, which is not always possible when glass tubes are employed. When Armand Gautier was making researches on the influence of temperature on the combination of gases in 1869, he succeeded in making small tubes of quartz, employed as air thermometers, and as coils for causing gaseous mixtures to circulate in unalterable capillary tubes. The apparatus thus constructed of quartz was shown by him at the Universal Exhibition of 1878.

The Harvest of the North Sea.—When fishing is slack, the Yarmouth boatmen sweep the Roads for lost anchors. During 1899, fifty-two and a half tons of anchors were thus sent to the Custom House Anchor Yard. The boatmen receive allowances, according to the weight of metal, from the Receiver of Wrecks. The collected anchors are disposed of by tender as old iron. Dover gleaned sixty tons of anchors from the Downs during last year. The Hull boatmen gathered twenty-two tons of anchors, the Lowestoft boatmen twelve tons of anchors, and the Folkestone boatmen five tons of anchors.

A New Industry for Ireland.—An interesting experiment has recently been made by the Agricultural Organisation Society. A crop of tobacco has been grown, cured, and manufactured in County Meath. The tobacco, which is said to be good, is now being sold at fourpence halfpenny an ounce, and the Society thinks it could be grown at a profit of £260 an acre.

A Motor as a Scarf-Pin.—The smallest operative electric motor in the world is a scarf-pin which weighs only one pennyweight three grains. Gold takes the place of copper throughout, and the field magnets consist of two thicknesses of a very fine sheet iron, scraped down and polished. These are held together with gold screws, and bound in the regulation manner with very fine silk-covered wire. The commutator bars are also of gold, and very tiny brushes deliver the current to the armature windings. The little motor is supplied with current from a small silver-chloride battery carried in the vest pocket.

The First Steam Vessel.—The first steam vessel was built in 1839, for the East India Company. She was built by a subordinate of George Stephenson, Philip England, who drove the first engine that steamed out of London. It ran on September 17, 1838, from Euston to Boxmoor Heath, and the train consisted of four open coaches. The first English steam vessel, the *Vernon*, was an ordinary sailing ship, with a donkey engine of some thirty horse power.

Arsenical Wall Papers and Mould Fungi.—Herr H. A. Schmidt has found that four of the commonest mould fungi have a very strong reducing power where arsenical wall papers are concerned. *Penicillium glaucum*, *Aspergillus flavus*, *Mucor mucedo*, and *Dematium pullulans* readily set free arseniuretted hydrogen when present on hangings or papers coloured by an arsenical pigment.

Diseases of Wheat.—M. L. Mangin has recently been investigating wheat diseases, especially the disease known as "piétin." "Piétin" chiefly attacks the haulms, and is caused by *Leptosphæria herpotrichoides*, often accompanied by *Ophiobolus graminis*, *Pyrenophora trichostoma*, and the conidial forms of *Dictyosporium opacum* (?), *Coniosporium rhizophyllum*, and *Aspergillus circinatus* sp. n. Through cultural experiments he found that *Dictyosporium opacum* (?) is the conidial form of *Leptosphæria herpotrichoides*, and *Coniosporium rhizophyllum* (?) the conidial form of *Ophiobolus graminis*. *Septoria graminis* is also very destructive, putting out germinating filaments which do not enter through the stomates; their action is purely chemical.

Ants and Shrubs.—Dr. Buscalioni and Herr Huber, during a stay in South America, have found reason to doubt the correctness of the current theory that ants protect myrmecophilous trees and shrubs against the attack of other injurious insects, especially leaf-cutting ants. Myrmecophilous species abound chiefly in localities which are frequently submerged by floods, where leaf-cutting ants do not exist. This is especially the case with species of *Cecropia*. Dr. Buscalioni and Herr Huber think that the myrmecophilous habit is confined to species which inhabit localities liable to be flooded, or which have been at some previous time liable to be flooded, or to species descended from those which inhabited such localities. The habit seems to them simply one for the advantage of the inhabiting ants themselves.

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OUR COMPETITION PAGE

OUR FRENCH PRIZE COMPETITION.

Prize Editor—W. T. THOMPSON, B.A. (LOND.), *French and German Honours.*

WE should like to specially direct the attention of our readers to the fact that the Board of Education, in the Syllabus for Certificate Examinations for the year 1901, requires "no set books" for French and German. Students preparing for these examinations, as well as students for London Matriculation, could not do better than attempt month by month the pieces set for translation here. They are from the best authors, and of varied character. A competitor who does not gain a prize can derive considerable benefit from the exercise. A study of the successful competitor's translation, and of our remarks, will help him to see where he might have done better. If desired, his paper can be returned (fully corrected) by enclosing six stamps.—ED.

RULES.

1. All translations should be **posted not later than June 8,** and addressed:—*Prize Editor*, Office of THE PRACTICAL TEACHER, 35 and 36 Paternoster Row, London, E.C.
2. Competitors should cut out and send the Coupon which appears on the Back Wrapper page of the current number.
3. Competitors should adopt a pseudonym, and send name and address written on a separate piece of paper.
4. No competitor may take the prize offered more than once in three months.

FRENCH PRIZE COMPETITION.

A Prize of One Guinea will be given for the best translation into English of the following extract:—

J'entrai l'autre jour chez une jeune femme, que je trouvai mélancolique.—Je suis triste, dit elle; j'ai lu hier des contes de fées; j'ai rêvé toute la nuit de fées marraines qui vous comblent de dons précieux,—du chapeau de roses du prince Lutin, qui rend invisible,—de l'anneau du prince Loulou, qui le fait paraître si charmant, qu'aucune femme ne lui résiste,—et, en me réveillant, j'ai été toute découragée de me retrouver dans la vie réelle.

—C'est que vous ne regardez pas bien, lui dis-je; ces prodiges se renouvellent tous les jours.—Vous n'avez qu'à dire tantôt aux gens qui vous feront visite que vous êtes filleule, ou nièce, ou cousine d'un homme en place, et vous verrez que de beauté et d'esprit cela ajoutera au joli lot que vous en avez déjà;—vous verrez que de complaisances et d'adulations on aura pour vous.—Il n'y a même pas besoin, comme dans les contes de fées, que vous soyez réellement la filleule, il suffit de le dire.

Je sais un homme—qui est né grossier, butor, laid, mal bâti et bête autant qu'on peut l'être;—eh bien! lorsqu'il met à son doigt un anneau sur lequel est un gros caillou appelé diamant—il devient spirituel, bien élevé, joli et de très-bonne compagnie,—du moins tout le monde le voit ainsi.

Quand je veux me rendre invisible,—j'ai un certain vieux chapeau, rougi et chauve, que je mets sur ma tête comme le prince Lutin fait de son chapeau de roses;—j'y joins un certain paletot râpé;—eh bien! je deviens invisible, personne ne me voit, ne me reconnaît, ne me salue dans la rue.

ALPHONSE KARR.

RESULT OF THE MAY COMPETITION.

French.

The prize is awarded to "G.B.," the pseudonym of George Brown, 11 Dalziel Place, London Road, Edinburgh.

First Class.—Marzavan, Ajax, La Mancha, Guiseppe, Le capitaine Fracasse, Dr. Dee, Chemineau, Carpe diem, Sardius, Agaznog, Septentriones, Rutherford, Nota bene, Gwelo, Gargantua, La poupée, M.E.R., Hundi, Stay at home, Sea, Chêne, Huddersfield, Shakspere, Dum spiro spero, Sinjunalis, C.E.M., Ecossaise, W.M.E., Edina, La Crevy, Mosaic, de Moravia, E.S., Orion, Clowes, Fingal, Gloria, Froggie, Forward, Aldebaran, Polly, Lavandula, Noir, Micawber, Workhard, Brünholf, H.S.S., Crocus, Millom, Vita, Comus, May, Jehun, F.M.F., G.S.W., Rex, Nolle, Manu forti, Chang, Alexis, Smoke, Emile, Student, Autier, Coquelin, Our Bobs, L.N., Rosa, Sipa, Louisiana, Elise, F.M.I., Omega, Kirkby, du Guesclin (Tavistock), Merle, Sciron, Alpha Pi, Annette, Poulton, Tyne, Borealis, Ghislaine, (name illegible), Marigold, Paardekraal, Josepha, Caen, Kythé, Rioghail, Nita, Sestertii, Marie (I), Perseverance, Jamaica, Montesquieu, Tibi, Dugueslin (Glos), L'été, Macte virtute, Uranie, Kappje, W.B.T., Oriana, Sequah, E.C.G., Katrina, Sheila, Bert, Glen Ogle, Viator, S.D., Marie Antoinette, Leamington, (name illegible), Beta, Vigilabo, Guida, Marguerite, West, Abigail, Lowestoft, Southlands, A.W.L., Marcus Antonius, Excelsior, Potentissima. (Names illegible—(?) Jay Wess, Foxunion).

Second Class.—Newg, Hope, Suspinul, Camo, E. St. Martin, Tolpan, Marseillais, Raven, Shamrock, Ixia, Air, M.E.T., Legality, Seiznem, Bella, J'espère, Allez, Staley, Syringa, Iris, Palmam qui meruit ferat, Thor, Royster, Malvoisin, Katherine, Teapot, Klee, Concours, Photini, Edythe, La marguerite, Wallflower, D.E.L.

Third Class.—Antoinette, Espérance, Cissy.

Disqualified: Rule 2, Ennui, Osceola; Rule 3, Nord.

Report.

The construction of the piece set did not present much difficulty. Mistakes were mainly made in the translation of words. Although there is a remarkable number of really good papers, not a few still present the mosaic appearance which results from getting a dictionary meaning for each word singly, without looking at the word in its connection. Thus we have papers remarking on "the imposing unsociableness of the scenery." Half a dozen candidates translated *sauvagerie* in this way. Another candidate translates *Dans une diligence*, etc., by "In a dispatch on a road for iron." *A partir du jour de sa naissance* brought out some wonderful translations, such as "In setting out on the day of his birth" (the objective of the journey is not stated.—ED.). "Every one will be able to see on the day of his birth what will happen to him till the time of his death." Candidates should remember that if their translations do not make common-sense, there must be something wrong with them. In one case three papers were sent up with one coupon. Only the first of the papers so sent was marked.

French Prize Translation.

To see the Spaniard throw off all imitation of foreign peoples and resume the originality that characterised him of yore, you must see him on his travels. The true national character shows itself unalloyed in all its entirety in these convoys across the mountains, which cannot differ in many respects from the caravans of the desert. The ruggedness of the almost undistinguishable roads; the wild, impressive grandeur of the scenery; the picturesque costume of the *arrieros* or muleteers; the fantastic harness of the mules, horses, and asses, marching in file—all combine to transport you thousands of miles from the world of civilisation. Travel then becomes a reality, a performance in which you yourself participate. Travelling by coach or by rail, you cease to be a man; you are but an inert piece of matter, a bale of goods; you are very little different from your trunk. You are bundled from place to place—that is all. You might as well stay at home. The true pleasure of the traveller consists in the difficulties of the journey, in its fatigues—nay, even in its dangers. What charm can there be in an excursion in which you are always sure of reaching your destination, of finding horses waiting ready for you, as well as a soft bed, an excellent supper, and every convenience that one enjoys at home? One of the great misfortunes of our modern life is its deficiency in what is unforeseen, the total absence of random adventures. Everything is so well regulated, the wheels of life are made to fit into one another so exactly, and all acts are so carefully classified, that chance is now impossible. Another century of this "improving" process and every one will be able to foresee from the day of his birth what is to happen to him up to the day of his death.

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THE EDITOR'S TABLE

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AMERICAN BOOK COMPANY, NEW YORK.

Selections from the Correspondence of Cicero. Edited, for sight-reading, by J. C. Kirtland. This little book is designed as a series of exercises in translation at sight. Fifty-four of Cicero's letters have been drawn upon. Varied in subject, they are easy in diction, for most of them were intended only for the eyes of his correspondents. They give us an interesting account of Roman life and character, and are not without autobiographical interest. At the same time, they form one of the chief sources for the history of the last years of the Republic. There is a short and rather interesting introduction. It deals briefly with the subject of Roman writing materials, ancient paper, the method of transmission of letters and their form. There are also paragraphs on the collections of Cicero's letters, the publication of the letters, Atticus, and the stylistic peculiarities of the letters. The text, which is mainly based on the recensions of Mendelssohn, Wesenberg, and O. E. Schmidt, is clearly printed; the quantities are marked; and the notes, which are mainly historical, are brief. The preface urges the advisability of rapid sight-reading as soon as the regular forms and some elementary syntax have been mastered. Much of Roman literature made its appeal, in the first instance, to the ear rather than the eye, and many a difficult passage may be made clear by carefully reading it aloud. The book (103 pages) is prettily bound in linen. There is no index.

Method in Education. By Ruric N. Roark, Ph.D. Books on education find much more favour in the eyes of our American colleagues than they do with us, hence the large number of books on the art, theory, and practice of education published in the States. Dr. Roark has been successful in stating the main positions of the teacher's craft in pleasing and philosophic guise, the result being a book that may be read with profit by every earnest teacher not only in America, but also in England.

La Cigale chez les Fourmies, par Legouvé et Labiche. Edited, with notes and vocabulary, by T. J. Farrar, M.A., Instructor in the Washington and Lee University. This edition of Labiche's charming comedy is got up in the excellent style which characterises the productions of the American Book Company. The vocabulary appears to be complete, and the notes, which are practical and not too voluminous, are placed at the foot of the page. The number of typographical errors is a serious blemish on what would otherwise be an excellent production.

ARMAND COLIN ET CIE., PARIS.

Les Femmes d'Amérique, by Th. Bentzon, is full of interest, and deserves to be widely known, not only among Th. Bentzon's compatriots, but also among English and American readers generally. The French is clear and simple in style, and the descriptions of the early colonists of America are especially delightful. The authoress has lived in America, and been on terms of friendship with distinguished American women. She writes *con amore*, and when she claims, in writing the biographies of "the grandmothers of the great ladies of the republic," to fill a vacant space, she claims less than her due; for the book is not merely biographical, but contains many thoughtful passages on the great problems now before the world—the education of children and the true place of the "new woman"—sometimes original, at others quoted from the writings of the subject of the biography. Speaking of teaching, in the biography of Lucretia Crocker, she says: "Cette carrière est la plus haute et la plus naturelle à la fois pour les personnes de notre sexe. Bien comprise, elle implique en effet les devoirs de la maternité; une maternité sans égoïsme, élevée au-dessus de l'instinct." Surely no higher standard can be set before the women teachers of any age or land. In another part of the book she points out that in America the women who led the movement for equality of woman with man were themselves models of domestic virtue. In the lives of "Margaret Fuller, author of *Woman in the Nineteenth Century*," and "Anna Cora Mowatt, the actress," she depicts, and evidently revels in so doing, an almost saintly devotion to family duties.

Certainly the book is a book of the hour, and is fitly produced at the opening of the twentieth century.

Turning to the historico-biographical side of the book, we have a bright little account of the Pilgrim Fathers, written in a spirit of sympathy worthy of a New Englander of to-day, and altogether surprising from the pen of a Frenchwoman. The fact that a girl, Mary Chilton, was the first of the pilgrims of the *Mayflower* to step on shore is pleasantly taken as ominous of the future influential position of women in America.

Lady Arabella Johnson, wife of Mr. Johnson and daughter of the Earl of Lincoln, who a few years later came with her husband to New England, is the subject of the first biography, followed by those of Anne Bradstreet and Mrs. Hutchinson, who landed in Massachusetts in 1634. These lead to much interesting historical information about the early days of the colony, and the various early governors, notably that Sir Harry Vane from whom, a few years later, Cromwell prayed, "The Lord deliver me."

Here it may be noticed that an unlucky printer's error gives the date "1834." On page 7 a similar one occurs—"1824" being given for 1624; and on page 297 another misprint occurs, regrettable in a book generally remarkable for accuracy.

After the "Women of the Colonial Period," we come to "Women during the War of Independence." In the first of these, Eliza Kemper, afterwards Mrs. Morton, we find the real heroine of the pretty old story of the child taming a rattlesnake. Little Eliza shared her breakfast daily with her strange friend. Alas for little Eliza! her father did not participate in her faith, and the snake was shot. One hardly knows on whom to bestow most sympathy—the terrified father or the little loving child.

Mr. Morton, known as "the rebel banker," placed his large fortune at the disposal of the American army; therefore it will be readily understood that Eliza suffered many things in the cause of freedom. She had, however, the proud satisfaction of calling her son after Washington—the first American baby to have that honour. The story of little Washington Morton losing the only darning-needle of the village where the Mortons lived, when sent to carry it to a neighbour's house, gives a vivid idea of the petty miseries which the Americans had to undergo at the time of the war; while the shameful story of the murder of the young wife of Pastor Caldwell by British troops in Connecticut in 1780 makes clear the cause of the long-continued hatred in America to "Britishers," and fills one with thankfulness that a wise policy on the part of our Government has succeeded in wiping out the very natural bitterness of our brothers across the water.

Then follow the stories of Mrs. Quincy, whose husband was a member of Congress and afterwards President of Harvard University; of Abigail, wife of John Adams, who was sent to represent America at the court of George the Third after the recognition of American independence; and of Dolly, wife of President Madison. All these women mixed greatly in politics, and were in daily intercourse with some of the greatest men of that time.

It seems strange that though Mrs. Washington is mentioned, her biography is not given; and its absence spoils to some extent the completeness of the book.

Coming to our own time, we have Margaret Fuller, born 1810, one of the great leaders of modern thought on the question of the rights of woman; a marvellous person, who at fifteen years of age could do with about six hours' sleep, and study most of the day! In her biography occurs the curious statement that during her visit to England in 1846 she listened to the "eloquence of *Fox*." Now, as the great Fox had then been dead about forty years, one is a little puzzled at the assertion. However, one must not be hypercritical. Th. Bentzon escapes this sort of blunder in a marked degree, considering her nationality.

Margaret Fuller's story is full of interest and instruction, but the chapter on the "Women Poets of America" falls rather flat. However, the fault is with the poets, not their biographer. As a consolation she gives us a charming picture of Harriet Beecher

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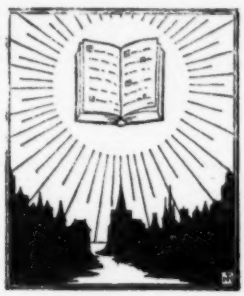

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In the note to page 47, line 22, the phrase "the latter" is apparently a mistake for "the former," as it was Condé who marched at the head of a Spanish contingent, and not Turenne. This is the only fault we can find with notes which must prove of very great service indeed to the student. The book contains a vocabulary in alphabetical order. A very useful set of imitative exercises has been drawn up by Messieurs Lazare and Minoggio, which will help the student in his French composition, and test his knowledge of the above book.

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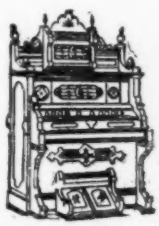

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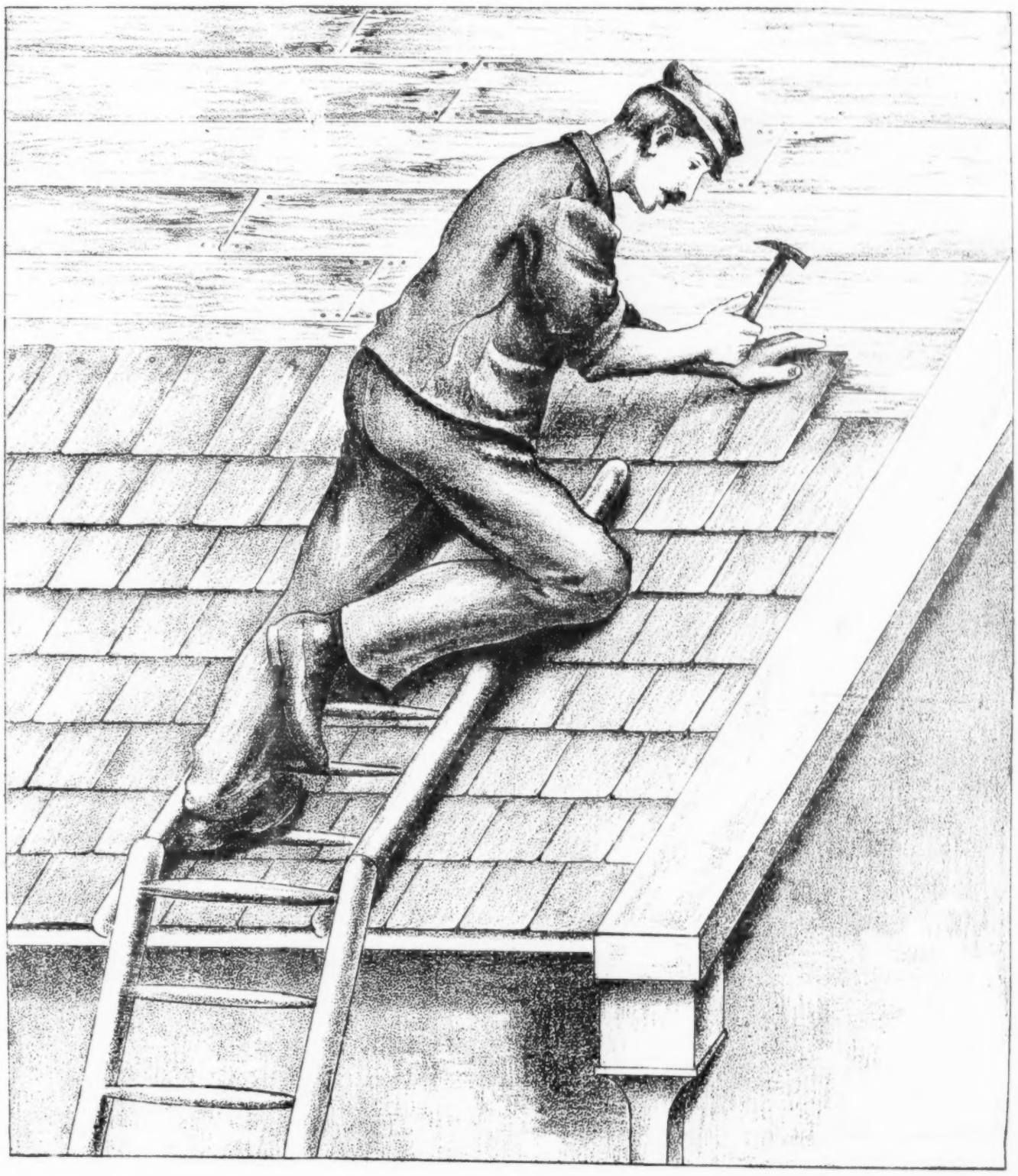

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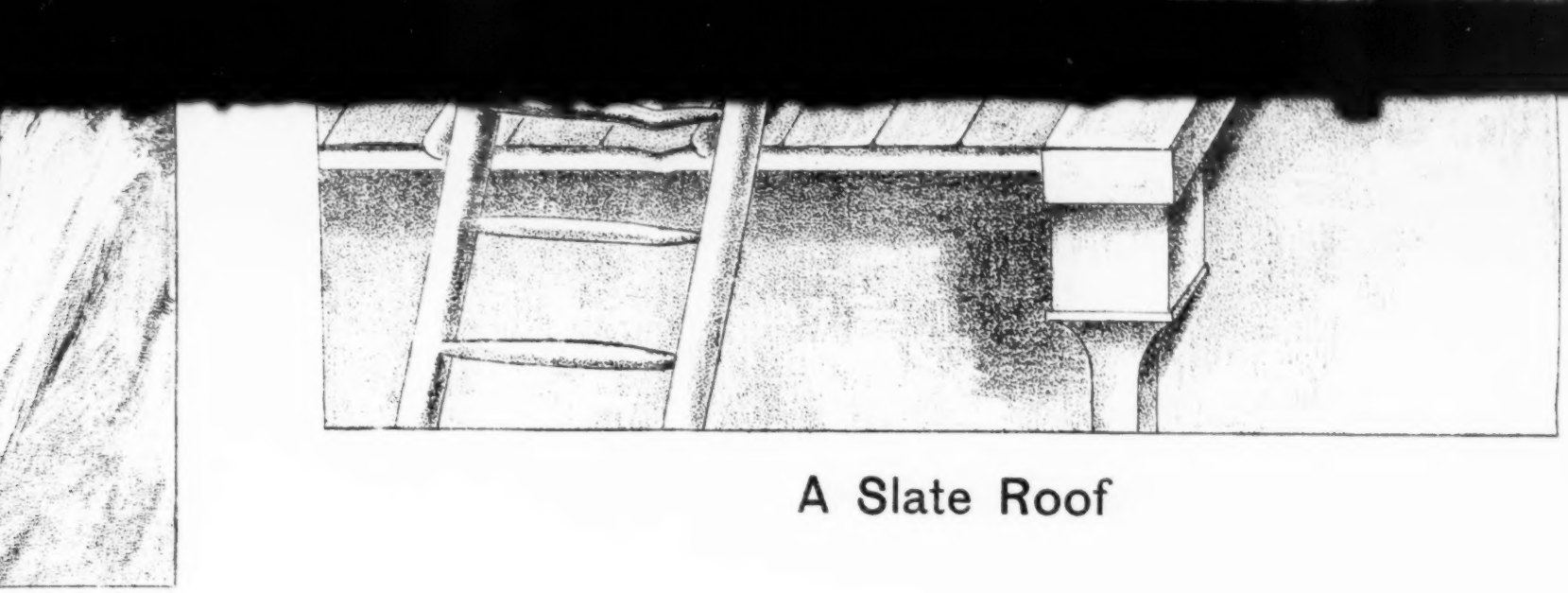

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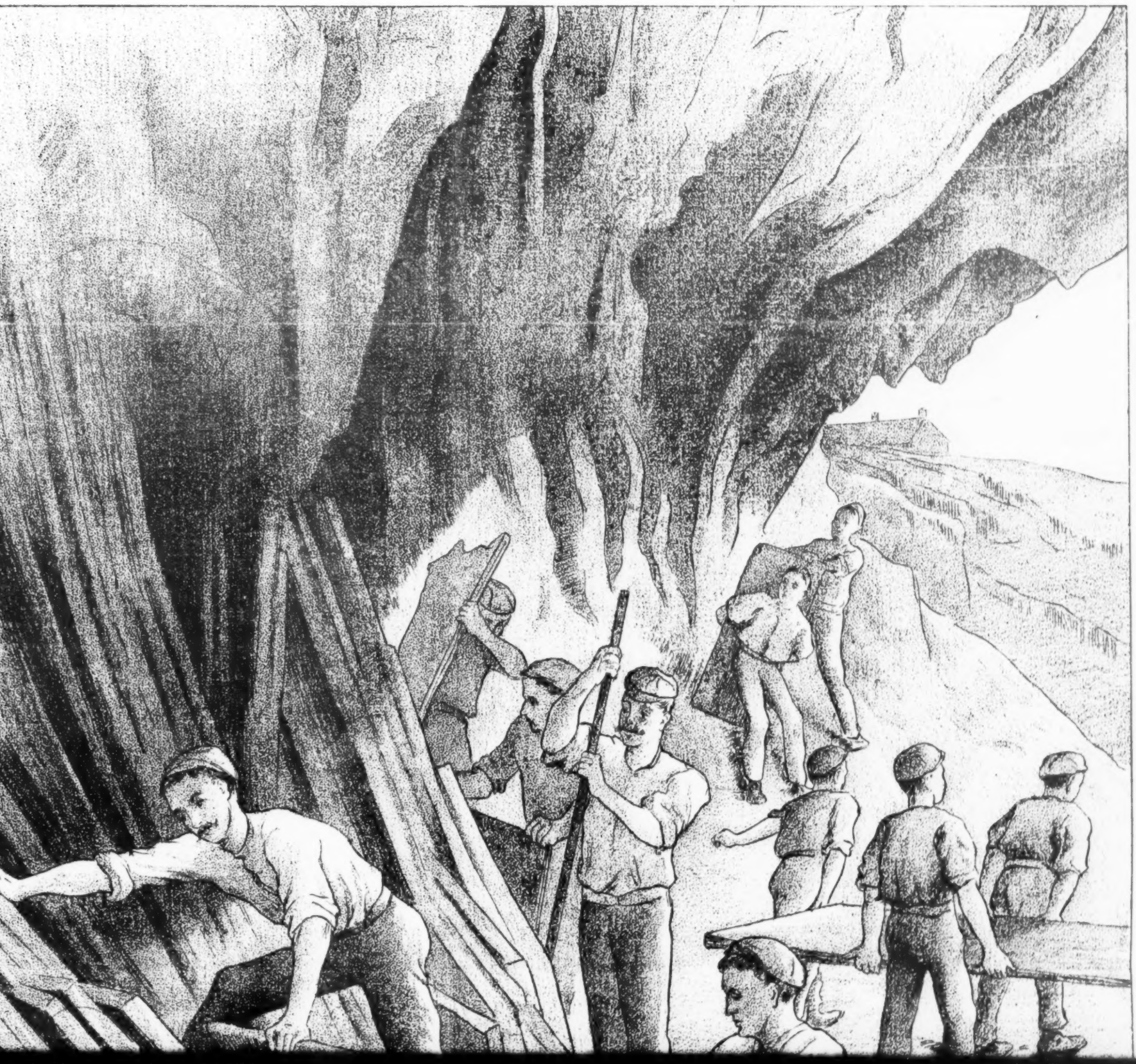

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